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"River Front Development Ghaggar River"

Institute of Town Planners, India

Haryana Regional Chapter
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Haryana-13411

"River Front Development Ghaggar River"

Preface

The present study is ninth study conducted by ITPI-HRC to foster the objectives of research in spatial planning Including Regional Planning, environment planning etc. to effectively contribute to planning and development Eco-system. The objective of this study is to tap the latent potential of beauty of Ghaggar River by developing its river front and to save the land along river front from encroachment by slums and squatters. The study embraces mainly two parts first is Literature Review and second is Research Study Area. Besides introducing types & Characteristics of Riverfront development, Need, Concept & its Advantages, General Principles & Elements for successful Riverfront Development, Guidelines needed for Riverfront Development Projects and Case Studies are also elaborated in first part. The background of Study Area: Ghaggar, Site Selection, Area potential & Need for Riverfront Development of Ghaggar River, Scope, Aim & Objectives of the Project, Project methodology, Issues & Site challenges, Design Concept & Features and Recommendations & Conclusion form the second part of the study.

Inspite of lot of limitations such as data unavailability from various departments and Covid-19 induced lockdown, Research team conducted Recci-survey by personal visits and completed the study and brought out the necessity of conducting further research by outsourcing the study to any specialized agency on turnkey bases by the concerned Government Departments/Agencies engaged in land development for its optimum utilization.

I am thankful to Ms. Gurpreet Kaur and Ms. Vijeta Nigam, Research Officer, ITPI- HRC for outstanding work. I am also thankful to Sh. Sham Das Saini for his guidance as a research guide and all the members of ITPI-HRC, who have made valuable contributions to this study.

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Chairman, ITPI-HRC

Table of Contents

List of Figures

18.	Lower Promenade	12
19.	Boating Station	12
20.	Riverfront Park: Usmanpura	13
21.	Riverfront Park: Subhash Bridge	13
22.	Plaza at Gandhi Ashram	13
23.	Riverfront Flower Park	13
24.	Heritage Plaza near LalDarwaja	13
25.	Cycling	13
26.	Recreational Activities	13
27.	Cruise Ride	13
28.	Sports Car Ride	13
29.	Kite Flying	13
30.	Riverfront Market	14
31.	Exhibition Centre	14
32.	Events Ground	14
33.	Laundry Campus	14
34.	Ghaggar and other sub-basin which covers part of Punjab, Rajasthan and Haryana states forms the largest sub-basin of Indus basin	15
35.	Ghaggar river in Haryana	15
36.	Layout plan of Panchkula urban complex	15
37.	Site & Surroundings	16
38.	Site Selected (Stretch 7Km)	17
39.	NH in the vicinity of site	17
40.	Tourist attractions in the vicinity of site	17
41.	Ghaggar River	18
42.	ChhathGhat	18
43.	Shiv Temple	18
44.	GogamediDevinagar	18
45.	Nada Sahib	18

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Chapter-I

Introduction

1.1 Introduction to "Riverfront Development"

Industrial age was a major landmark for riverfronts as their roles changed drastically owing to their use for navigation purposes along with new inventions, large scale production initiatives, and location of industries along rivers. Another major change was seen in the late 20th century when, retreat of industries from riverfronts led to change in approach towards development of riverfronts in urban areas which increased public access to rivers. Today Riverfront redevelopments are viewed globally as a means of economic and cultural growth, and are dominated by commerce and recreation to create a thriving and continuous public realm.

However, in India, rivers carry religious status for Hindus from Vedic age, these have been respected and feared as the provider and destroyer and many pilgrimage centers and temples are located along the riverfronts. In addition there has been an exponential increase in the development pressure on cities due to influx of population from rural areas. This has led to a corresponding increase in demand for public realm in cities. To attract investments cities need to portray a sustainable social, economic and cultural outlook. However, rivers in India have been neglected and health of the river systems is far below global standards. The conditions are fast deteriorating with increasing amount of solid and liquid discharge dumped in these rivers. Besides, concern of climate change, ecology and depleting resources have become important considerations for all urban development projects. Riverfront development encompasses ecological, economic and social aspects. Though fast transformations take place in economic domain while social and ecological changes take time to manifest. Planning and design of public realms require interpolations and assessment of needs, opportunities and possible threats, so it is not surprising that the economic benefits outweigh social and ecological ones. In India social sustenance which was earlier well woven into the economic and ecological fabric, is being eroded. Rivers and riverfronts which were important components of social fabric have undergone rapid changes due to transformations in their use, pressure of urbanization and degrading health of river systems.

The first waterfront development projects were started in North American cities, in particular Baltimore & Boston, in the 1960s. Nowadays, waterfront development is a global trend and thousands of schemes are been carried out in large metropolises, medium-sized

cities and even small towns all over the world. Whereas the early examples of waterfront development primarily focused on leisure and retail, contemporary schemes have a broader scope; many are set up with the aim to create attractive mixed urban environments that appeal to the imagination of people and persuade them to work there, to live there, or to visit these.

An official definition by the US Federal Coastal Zone Management Act, Office of Ocean and Coastal Resources (OOCR) (1972) defines the term urban waterfront or port as, *"Any developed area that is densely populated and is being used for, or has been used for urban residential, recreational, commercial, shipping, or industrial purposes".*[1]

A more detailed definition by Guo (1998) as cited in Dong (2004, p.7) *described the waterfront as the interface point where land and water meet, between approximately 200-300 meters from the water line and 1-2 km to the land site and also takes in land within 20 minutes walking distance.* Wu & Gao, 2002, *as cited in Dong (2004, p.7) added the waterfront area should have multiple features which incorporate each other and surrounded by structural and non- structural objects to form a focal point.*[2]

1.2 Riverfront Development: It's Types & Characteristics

Waterfront development refers to any development in front of water and a water body; a river, lake, ocean, bay, creek or canal. In the development area, considered that a waterfront development may not necessarily need to be directly fronting water but may only need to look attached to the water. Types of riverfront development are as follow:

i. **The Natural Waterfront**, comprising beaches, wetlands, wildlife habitats, sensitive ecosystems and the water itself.

ii. **The Environmental Riverfronts,** "Design with nature" might include shore stabilization, wetland preservation, prairie restoration etc.

iii. **The Public Waterfront,** including parks, street ends, vistas and waterways that offer public open spaces and waterfront views. Various types of public waterfront are as given below:

    a) **Mixed-use Riverfronts -** Dynamic space containing various activities blended to complement each other.

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[1] Thesis on "Riverfront Development Kanakapura" by A.R Alagarsamy, CEPT university, Ahmedabad, retrieved from www.academia.edu/10171888/Riverfront_Development #:~:text=An%20official%20definition %20by%20the ,recreational%2 C%20commercial %2C%20shipping %2C%20or.

[2] "Waterfront development – Dubai" retrieved from https://www.researchgate.net/publication /296176655_Waterfront_development_-_Dubai

b) **Recreational Riverfronts** - "The place of community gathering" parks, gardens, picnic areas, walking, cycling and water related activities including boating, fishing, etc.

c) **Historic Riverfronts** - "A sense of uniqueness and character" to a place. Provide a special educational experience by preserving the cultural heritage of place.

iv. **The Working Waterfront**, where water dependent, maritime and industrial uses cluster or where various transportation and municipal facilities are dispersed. *For example* river-related activity like fishing, boat repair, etc.

v. **The Redeveloping Waterfront**, where land uses have recently changed or where vacant and underutilized properties suggest potential for beneficial change.

vi. **Other Waterfronts**

a) **Residential Riverfronts** - Housings, creates opportunities for other activities like retail, recreation, restaurants.

b) **Cultural Riverfronts** - Sense of community, festivity, artistic expression, recreation, commercial bustle.[3]

1.3 Need of Riverfront Development

A river attracts people, hence riverfronts have emerged as lively Urban Cores of cities their sociocultural, intellectual and economic centers. People are inherently drawn to water; hence waterfront development provides a unique opportunity for developing a strong city image. The Riverfront Development Plan defines that vision, provides a framework that allows us to capitalize on the energy, interest and goodwill that has coalesced around our rivers. Adding to its value with greenways and other amenities and attracting public attention. Cities enjoy increased tourism, employment and growth. An environmentally conscious approach has been planned for integration of the river into the urban fabric development. There has been an appropriate consideration of the natural potential of the land for developing into a biodiversity zone for conserving the natural heritage of the river basin as well as the local and transient requirements of facilities at the city level.

i. Today many waterfronts are a staple of modernism and city beautification. It formulates the framework for socio-interactive spaces.

ii. It explores and enhances the network of public spaces for recreation and open green spaces that attract both citizens and tourist to riverfront.

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[3] https://www.slideshare.net/2711798/river-front-development-75862095

iii. Affects the feel of belonging, and the social cohesion within a community.

iv. It reflects the city image-branding, its local culture or historic documentation and supports economic growth.

v. Often in larger cities that border a river, the riverfront will be lined with marinas, docks, trees, or minor attractions.

vi. It improves human/environmental connections by promoting social cohesion and interaction and identifying the various needs of socio cultural response to recreational use.

vii. It promotes sustainability of place and also could be used as alternative mean of transportation.

1.4 Objectives of Riverfront Development

i. Restore the existing natural features like water bodies, vegetation, etc.
ii. Connect the river with people and city in order to enhance the tourism.
iii. Protect the floodplains from adverse effects of development activities.
iv. Spread awareness among the people.

1.5 Riverfront Development: Concept & its Advantages

The target of riverfront development is to reach a high level of harmony between human beings and water, creating an energetic and healthy urban riverfront landscape environment. Aesthetic in ecology is guaranteed by the continued movement of life, which follows the law of the cycle of matter and the energy balance. It is not harmonious if the riverfront landscape is destroyed, the resources are lost and the environment is polluted. The concept of harmony in design means that human beings and the ecological system can receive benefits at the same time, creating a harmonious environment between the artificial landscape and the nature landscape, satisfying the needs of the body and the mind; these are also characteristics of sustainability. Some of the steps to be followed for developing riverfront are given below:

1. Public Space Appearance

In planning a waterfront development, city officials or a developer should begin by foreseeing a network of well-connected, multi-use public spaces that fit with the community's shared goals. By orienting waterfront revitalization around public spaces, new construction will enhance the quality of existing destinations. While streets may be appropriate on some waterfronts, pedestrian connections should be given top priority, making large parking lots and auto-oriented development.

2. Public Accessibility

For revamping waterfronts put public goals first, not private short-term financial objective. As long as redevelopment plans adhere to the concept that the waterfront is an inherently public asset, it will be relatively easy to follow the rest of the steps here. Community engagement and, ultimately, local ownership and pride depend on this basic premise.

Figure No 1: Successful waterfront destinations reach out to entire community, as happens with Paris.

3. Utilization of Existing Assets

After establishing the public spaces and public goals, begin the public visioning process with the existing assets and surrounding context. Start with the historical form and function of the site to foster a locally grounded identity by channeling former vibrancy into a variety of uses.

Figure No 2: Granville Island has created an abundance of user-friendly destinations while preserving the site's industrial character.

Surrounding neighborhoods should be integrated into the waterfront to strengthen connectivity between destinations. And new development should embrace its waterfront context with appropriate orientation and usages.

4. A Vision to Create Shared Community

Unlike a master plan, a community visioning process does not lock a project into a prescribed solution. It is a citizen-driven initiative that outlines a set of goals-ideals to strive for-that set the stage for people to think boldly, make breakthroughs, and achieve new possibilities for their waterfront. Because a vision is adaptable and can be implemented

gradually, starting with small experiments, it often becomes more powerful through time as public enthusiasm for making bold changes gains support.
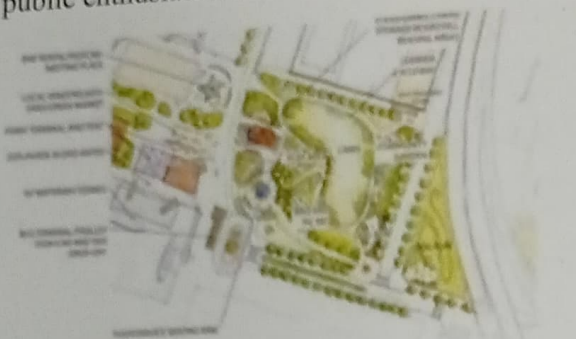

Figure No 3&4: A community visioning plan for Brooklyn's Pier 6 (left). The existing design did not benefit from a community process, and the community did not feel it reflected its needs (right).

5. Creating Multiple-Use Destinations

The most effective way to propel a visioning process is to set a goal of creating destinations along a waterfront. This focus on destinations, rather than "open space" or parks, enables a genuine community-led process. Residents, businesses, community organizations and other stakeholders all join in to help identify the key destinations and then define the uses and activities they want to see at each place. The same principle should be applied at each destination with multiple uses to come up with a list of activities for that spot.
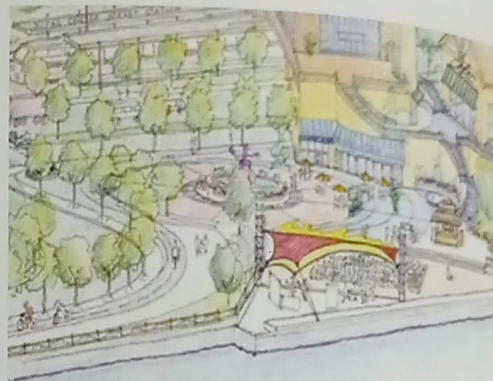
Figure No 5: After multiple place evaluation workshops, a variety of community stakeholders, public agencies, and private firms produced a collective vision for a broad range of uses to draw people to Newark's waterfront.

6. Link Destinations along the Waterfront

Destinations should be connected to one another and incorporated into a vision for the waterfront as a whole. A waterfront that is continuously walk able with a variety of activities along the way will successfully link destinations, allowing the appeal of each one to strengthen the place as a whole. Creating these seamless connections is a fascinating challenge that involves mixing uses (such as housing, recreation, entertainment and retail) and mixing

Figure No 6: Connecting the destinations at the San Diego Embarcadero.

partners (such as public institutions and local business owners). Another key element is attracting people to the waterfront on foot or bike, rather than just in their cars.

7. Accessibility to Public Use

It is essential that the waterfront be accessible for everyone to the greatest extent possible. Here too, the goal of continuity is of paramount importance. Waterfronts with continuous public access are much more popular than those where public space is interrupted. Even small stretches where the waterfront is unavailable to people greatly diminish the experience. Access also means that people can actually interact with the water in numerous ways--from swimming and fishing, to picnicking dockside and feeding the ducks. If it is not possible to actually dip their hands in the water,

Figure No 7: Access the strongest locations and connections for new waterfront destinations on Vancouver's False Creek.

people should have access to another type of water nearby--such as a fountain, spray play area or a swimming pool that floats next to the shore.

8. Creating Balance between Humans and Environment

While a wide variety of uses can flourish on a waterfront, many successful destinations embrace their natural surroundings by creating a close connection between human and natural needs. Marine biologists and environmentalists today promote the restoration of natural shorelines -- at least where marine uses do not dominate – and advocate replacing crumbling bulkheads with natural vegetation that will improve water quality,

Figure No 8: Boardwalks, such as this one in Cleveland, provide opportunities for people to interact with wildlife along natural shorelines.

and revive fish and wildlife habitat. But this natural restoration should not preclude human use. Boardwalks, interpretive displays, and even more active uses such as playgrounds and picnic areas can be incorporated into the shoreline design without sacrificing environmental benefits.

9. Small Start to Make Big Changes

Good public spaces don't happen overnight, and no one has all the answers about improving a place right at the outset. Place making is about doing more than planning. Many great plans get bogged down because they are too big, too expensive, and simply take too long to happen. Short-term actions, like planting flowers, can be a good way not only to test ideas, but to also give people the confidence that change is occurring – and that their ideas matter.[4]

Figure No 9: Temporary uses on Brooklyn's Pier 1 provide a successful example of how low-cost improvements can triangulate with their surroundings to create great destinations.

Its Advantages

The benefits and advantages of developing water front are manifold ranging from economic benefits, environmental benefits to social/ community benefits. These benefits are detailed below.

1. **Creation of jobs** - Jobs can be created by hosting commercial activities at the site.
2. **Source of revenue for government** - Shops, restaurants, sport activities transportation, boating, hoardings etc. will act as a source of income to the Government.
3. **Development of tourism** - Tourism can be developed by offering a variety of attractions like water sports, entertainment arenas, parks, shopping areas, etc.
4. **Economic spin-off** – River front development will lead to rise in the value of properties, which will act as a catalyst for redevelopment and renewal of nearby places.
5. **Habitat protection and restoration** - Conservation of water in the river Human/Environmental connections, Conservation and development of land Conservation of flora and fauna etc.
6. Maintenance of river bank and Flood control measures
7. **Provide the general public space** with an open space for leisure and recreation.
8. Creates a healthy and active urban environment by revitalizing the neighborhood.

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[4] December 31, 2018 "9 Steps to Creating a Great Waterfront" retrieved from https://www.pps.org/article /stepsto creating a great waterfront.

1.6 General Principles & Elements for successful Riverfront Development

Waterfront development planning is often guided by four priorities:

- Balanced land use;
- Respect for limited resources;
- Improved public access; and
- Safeguards for environmental quality.

The general principles for waterfront development are set out below:

i. *Interconnected, linear waterfront development with broad public access*

- Encouraging the use of the riverfront greenway as a daily commuter path and recreational amenity.
- Demonstrating the connection between access, greenway development and market demand.
- Creating a coherent, visually pleasing order to the water's edge.

ii. *Protection and enhancement of the natural riverfront environment*

- Documenting the ecological state of the waterfronts in order to preserve this environmentally diverse natural habitat.
- Preventing and, where possible, eliminating inappropriate uses and practices from the rivers' edge.
- Protecting existing natural areas from development.

iii. *Reclaim the city's identity as one of the best water cities*

- Raising public expectations of what the city's waterfront offers.
- Attracting people, investment and the best aspects of urban living to the waterfront.
- A new urban park type is based on providing solutions to ecological problems and expressions of the human relationship to nature.

In addition, Bertsch (2008) recommended several principles that must be included while developing plans for waterfront areas, as follows:-

i. **Accessibility** - The waterfront should not be isolated or separated from the development, so that the public can access the waterfront easily (convenient means for visitors to access the waterfront area).

ii.   **Integrated** – Integration of the history, culture and existing architecture are recommended for a new waterfront development.

iii.   **Sharing benefits** – A balance between public benefit and developer profitability must be found. A public-private partnership is essential for realizing the inspiration of the design.

iv.   **Stakeholder participation** – The involvement of multitudes of interested parties is compulsory: government agencies, developers, community organizations, environmental groups and the public all have a stake in the development of a waterfront property and all must be involved in the process.

v.   **Construction phase** – Breaking down a huge project into several phases and allowing a stakeholders and the general public to see this provides a vision for the future.

Thus, apparently, the harmonies of waterfront development could be achieved through combinations of people, nature and technology (Mann, 1973)[5].

1.7 Case Study

Sabarmati Riverfront Development

Sabarmati Riverfront is a waterfront being developed along the banks of Sabarmati River in Ahmedabad, India. It was proposed in 1960s and the construction began in 2005. Since 2012, the waterfront is

Figure No. 10: Sabarmati Riverfront Development

gradually opened to public as and when facilities are constructed and various facilities a actively under construction.[6]

1.7.1 Project Objectives

The project aims to reconnect the city with the river and positively transform t neglected aspects of the riverfront.

The objectives of this multidimensional project can be categorized under three topics.

- **Environmental Improvement:** Reduction in erosion and flood to safeguard the ci sewage diversion to clean the river; water retention and recharge.

5   Umut Pekin Timur (2013), "Urban Waterfront Regenerations" retrieved from https://www.intechopen.co
/books/advances-in-landscape-architecture/urban-waterfront-regenerations.
6 https://en.wikipedia.org/wiki/Sabarmati_Riverfront

- **Social Infrastructure:** Rehabilitation and resettlement of riverbed dwellers and activities; creation of parks and public spaces; provision of socio-cultural amenities for the city.
- **Sustainable Development:** Generation of resources, revitalization of neighborhoods.

1.7.2 Need for Riverfront Development

Untreated sewage flowed into the river through storm water outfalls and dumping of industrial waste posed a major health and environmental hazard. The river bank settlements were disastrously prone to floods and lacked basic infrastructure facilities. Lackluster development took shape along the riverfront. Such conditions made the river inaccessible and it became a virtual divide between the two parts of the city. The original condition of the river near Vadaj dry riverbed is having slums along the riverbanks and lackluster leads to development along the riverfront.

Figure No. 11: Original condition of the river near vadaj

Figure No. 12: Dry riverbed with slums along the riverbanks and lackluster development along the riverfront

1.7.3 Design Strategies:

- The Riverfront Development reclaims the Sabarmati banks publicly accessible.
- The project has provided more than 10 km of continuous pedestrian promenade on each bank and has also made public Ghats available for direct access to the water.
- 85% of riverfront land has been proposed for public infrastructure, recreational parks, plazas, sports facilities, and gardens.
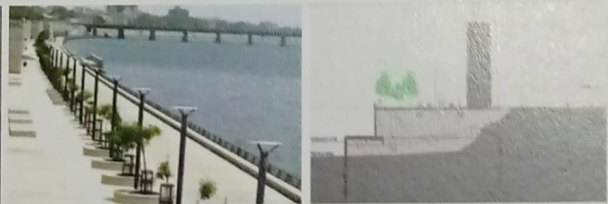

Figure No 13: Sabarmati Before RFD

Figure No 14: Sabarmati After RFD

- Introduction of civic and cultural institutions like museums, exhibition spaces, monuments, performance venues, has significantly enhanced the availability of civic amenities.

- Project has also focused to upgrade iconic informal markets, and to create vibrant new spaces for Residents and Tourists.

1.7.4 Major Components of Project

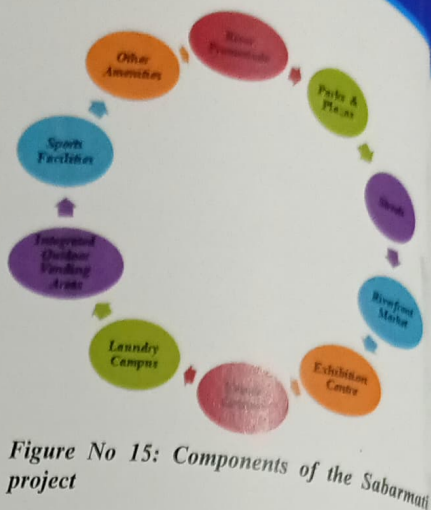The main components of the Sabarmati riverfront development project as given in the figure No.15.

Figure No 15: Components of the Sabarmati project

1. River Promenade

A key element of the project is a new linear two-level promenade:

i. The **lower promenade** having a minimum width of 10 meters lies just above the water level, providing uninterrupted pedestrian access to the water.

Figure No 16: Upper Promenade

Figure No 17: Walkway

ii. The **upper promenade** hosts a variety of public buildings, cultural and educational institutions, public parks and plazas and commercial development.

Figure No 18: Lower Promenade

Figure No 19: Boating Station

2. Parks & Plazas

There are numerous parks and plazas proposed and existing along the Sabarmati River named as Riverfront Park: Usmanpura, Riverfront Park Subhash Bridge, Heritage Plaza near Lal Darwaja, Plaza at Gandhi Ashram, Riverfront Flower Park etc. as shown in the figures given below.

| Figure No 20: Riverfront Park: Usmanpura | Figure No 21: Riverfront Park Subhash Bridge | Figure No 22: Plaza at Gandhi Ashram | Figure No 23: Riverfront Flower Park | Figure No 24: Heritage Plaza near Lal Darwaja |

The project has used more than a **quarter areas for creating public spaces** in the heart of the city. Elements include public **parks and gardens** to urban forests and shaded plazas. **The parks will help improve livability in the neighborhoods and also provide the city with much needed green spaces and breathing space** from the dense built environment. Whereas the **Plazas will provide public places for social gatherings and informal activities.**

3. Streets

The SRFD streets have been constructed to serve **as effective movement conduits.** The SRFD streets run parallel to the river on **both banks thus providing continuous access to the riverfront development.** All SRFD streets have **dedicated pedestrian paths with parking bays, cycle tracks and 6m wide carriageways.**

4. Sports Facilities

Sports facilities such as cycling, recreational activities, cruise ride, sports car ride and kite flying etc. are beneficial keeping in mind the location and surrounding area.

| Figure No. 25: Cycling | Figure No. 26: Recreational Activities | Figure No. 27: Cruise Ride | Figure No. 28: Sports Car Ride | Figure No. 29: Kite Flying |

5. Other Amenities

The Riverfront Market provides selected vending areas with 1,641 vendor platforms, seating areas, paved walkways, food streets, parking of vehicles and four public washrooms. The riverfront will host trade-fair facilities to serve the business community through **Exhibition Centre. Events Ground** will offer venues for holding planned events of local and national importance. The **Laundry Campus** provides facilities for the washing community as

traditionally riverbanks were used for laundering. **Integrated Outdoor Vending Areas provided** all along the length of the project will accommodate street vendors so they too benefit from the project. [7]

Figure No. 30: Riverfront Market

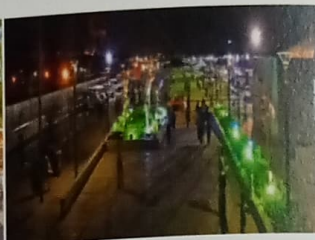**Figure No. 31: Exhibition Centre**

Figure No. 32: Events Ground

Figure No. 33: Laundry Campus

[7]   http://sabarmatiriverfront.com/project-objectives#:~:text=Project%20Objectives-,Project%20Objecti neglected %20aspects%20of%20the%20riverfront.

Chapter-II

Study Area - Ghaggar River

2.1 Background of Study Area: Ghaggar

The Ghaggar is an intermittent river in India, flowing during the monsoon season. The Ghaggar River originates in Shivalik Hills in Solan district then flowing through Panchkula (Haryana), Mohali and Patiala (Punjab) and this seasonal river feeds two irrigation canals that extend into Rajasthan. The present-day Saraswati River originates in a submontane region (Yamuna Region) and joins Ghaggar near

Figure No. 34: Ghaggar and other sub-basin which covers part of Punjab, Rajasthan and Haryana states forms the largest sub-basin of Indus basin
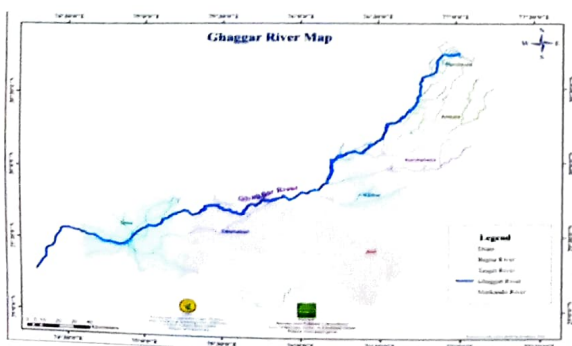
Shatrana in Punjab. Saraswati originates in Yamunanagar district of Rajasthan. A dried out channel of the Sutlej, joins the river Ghaggar near Sadulgarh (Hanumangarh), the Naiwal channel. The Ghaggar then joins with the dried up Drishadvati (Chautang) river. The wide river-bed (paleo-channel) of the Ghaggar suggests that the river once flows full of water, through the entire region, in the presently dried channel of the Hakra River, possibly emptying into the Rann-of- Kutch. It supposedly dried up due to the capture of its tributaries by the Indus and Yamuna rivers and the loss of rainfall in much of its catchment area due to deforestation and overgrazing.

The geographical extent of the Ghaggar and others sub-basin lies between 72° 20' to 77° 22' East longitudes and 27° 29' to 30° 54' North latitudes of the country. Ghaggar and

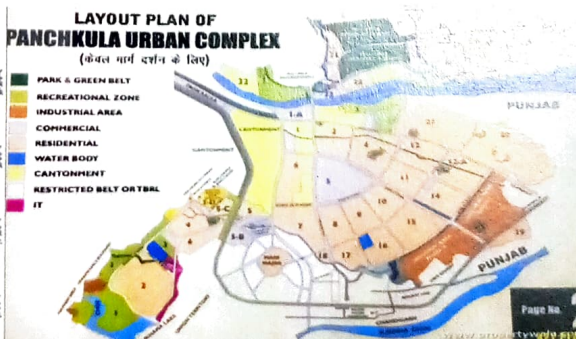*Figure No. 35: Ghaggar river in Haryana*

Figure No.36: Layout Plan of Panchkula Urban Complex

other sub-basin which covers part of Punjab, Rajasthan and Haryana states forms the largest