Final Year Project Showcase Batch 2019
Year 2024

	Department: Architecture and Planning. Programme: Archnitecture
1	**Project Idea** A holistic approach to flood-resilient community design in the face of climate change, integrating macro-scale flood defense strategies with culturally sensitive housing and master planning (in Sindh).
2	**Process** The process begins with extensive research on climate change and its impacts, particularly in our country and province of Sindh. One of which was increasing climate-induced migrations. The focus was how architectural strategies could enhance flood resilience for vulnerable communities. Initial studies included a detailed flood pattern analysis for the selection of the site, and the site was chosen near the Jamshoro industrial area adjacent to agricultural lands and around 2.5 km distant from river Indus, where majority of the people are farmers and industry workers living back from 1930s. An in depth site analysis of the Ramzan Rajar settlement was done investigating its social, cultural, and environmental contexts. Quantitative data identified trends of flood pattern, the declination in overall ecology, the loss during the extreme events, and housing needs, while qualitative research, including community engagement, provided insights into cultural preferences and challenges. This research informed the development of flood-resilient strategies on a macro level, including floodplains, sub surface drainage system, green buffers, dike and water management systems. Moving to the meso scale, a master plan was created, integrating these strategies with community-centric spaces, privacy layers, and infrastructure. The micro scale focused on designing culturally appropriate clustered housing modules for different income groups. The entire design process was iterative, refining concepts based on feedback from jurors, stakeholders, and community members, resulting in a comprehensive, contextually relevant solution to flood resilience.
3	**Outcome** The outcome of the study is the development of a holistic architectural and urban planning framework aimed at enhancing resilience to climate-induced challenges, particularly flooding. By integrating environmental sustainability with socio-cultural considerations, the project offers adaptable strategies for both rural and urban contexts. The outcome emphasizes the importance of combining flood mitigation measures with community-focused design, creating spaces that are not only protective but also support livelihoods and cultural practices. This study serves as a model for future development in flood-prone areas, addressing both immediate needs and long-term resilience.
4	**Evidence (Theoretical Basis)** Here are some research-based evidence that served as a platform for my project, focusing on climate resilience, flood management, and community-based design approaches: Climate Change and Flood Vulnerability: According to the Intergovernmental Panel on Climate Change (IPCC), South Asia, including Pakistan, is highly vulnerable to climate- induced disasters such as floods due to the region's changing monsoon patterns, rising temperatures, and melting glaciers. Floods in particular have become more frequent and severe in recent

	decades, leading to displacement and destruction of communities (IPCC, 2021). Pakistan's Vulnerability to Floods: A report by the Asian Development Bank (ADB) notes that Pakistan is one of the top ten countries most affected by climate-related disasters, particularly floods. Between 1998 and 2018, floods caused over 3,000 deaths and affected 10 million people, highlighting the need for flood-resilient infrastructure and policies (ADB, 2020). Integrated Water Management: The concept of "sponge cities" promoted by the UN- Habitat and applied in urban areas globally, such as in China, emphasizes the use of green infrastructure (e.g., rain gardens, permeable pavements, wetlands) to absorb floodwater, enhance biodiversity, and improve urban resilience (UN-Habitat, 2020). Community-Based Resilience: Research on disaster resilience by the World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) highlights the effectiveness of involving local communities in flood management strategies. By incorporating local knowledge, social norms, and participatory design, communities are more likely to adopt resilient practices and maintain infrastructure (GFDRR, 2015). This research addresses key gaps in flood resilience by combining macro, meso, and micro-level strategies that are both contextually and culturally relevant. It integrates vernacular architecture, green infrastructure, and community-based design to create flood-resilient, sustainable housing for the Ramzan Rajar settlement. By incorporating water management techniques like rain gardens and bio-swales, and aligning with community's social dynamics, the project bridges the gap between large-scale urban planning and site-specific, culturally accepted interventions. This holistic approach not only enhances flood resilience but also ensures long-term sustainability and social cohesion.
5	**Impact on Sustainability of Urban Regions or SDG-11 "Sustainable Cities and Communities"** This project directly contributes to the sustainability of urban regions and aligns with SDG-11 Sustainable Cities and Communities, by prioritizing flood resilience, sustainable housing, uplifting the overall ecology and community-based design. The incorporation of flood mitigation strategies such as rain gardens, bio-swales, permeable surfaces, water harvesting and raised plinths supports climate adaptation in vulnerable areas. These interventions reduce the impact of natural disasters while ensuring long-term livability. By emphasizing culturally appropriate clustered housing and communal spaces, the project strengthens social cohesion and fosters inclusivity. Moreover, the use of green infrastructure and locally sourced materials enhances environmental sustainability, reducing carbon footprints and encouraging the responsible use of resources. Overall, the project supports the creation of resilient, safe, and sustainable urban settlements, contributing to the global efforts of SDG-11.
	Competitive Advantage or Unique Selling Proposition The project's unique selling proposition lies in its comprehensive, context-sensitive approach to flood resilience, integrating sustainable practices with community-centric design, all while being cost-effective. Utilizing local materials and labor, the project minimizes expenses and supports the local economy. It incorporates practical solutions like green buffers, subsurface drainage, and water catchment ponds tailored to Ramzan

6	Rajar's needs, enhancing flood protection and environmental health. The design promotes community cohesion with clustered housing, flexible communal spaces, and essential amenities. Innovative infrastructure, including permeable surfaces and small-scale filtration plants, ensures effective water management. Additionally, the project's attractive communal spaces and eco-friendly features offer potential as a tourist destination, drawing visitors interested in sustainable living and flood resilience innovations in a community while maintaining their cultural livelihood like agriculture and cattle farming. These holistic, low-cost, and durable strategies not only addresses flood risks but also enriches local quality of life and presents a unique opportunity for tourism, setting it apart from conventional solutions.
a	**Attainment of any SDG** (e.g. How it is achieved and why it is necessary for the region) **SDG# 3,: Good Health and Well Being;** the disastrous impacts of flooding and climate change on the local ecology, soil, water, agriculture, plants will be reduced through integrating all those approaches as discussed above, the sanitation and maintenance which make it even more vulnerable to health problems. **SDG#8, : Decent Work and Economic Growth;** the women and children there are interested in arts and craft, they currently are indulged in stitching and embroidery works, beauty and cosmetics, if a well planned infrastructure will be provided it will increase the opportunity of being recognized initially in local area, near by settlements, main land. Moreover as raingardens/kitchen gardens provided in between the clusters, the provision of school, madrassa, dispensary, multi purpose building (as marriage hall), Tourist point, shops to rent out, will decrease their dependency on the mainland and increase the economic sustainability, as a self sustained settlement. **SDG#13,: Climate Action**; Flood resilience, climate responsive design and infrastructure, sustainable water management, green infrastructure, sponging capacity are all the enhanced output of the study as discussed. **SDG#15,: Life on land;** Biodiversity preservation, as the trend in declination of species recorded over the past 30 years, ecosystem restoration, usage of natural resources and sustainable landuse are all the outcomes of the study as a holistic approach. Addressing SDGs 3, 8, 13, and 15 is essential due to the region's critical challenges with flooding, climate change, and environmental degradation. In Sindh, where frequent flooding exacerbates health issues and disrupts agriculture, integrating flood resilience and climate-responsive design will significantly enhance public health and environmental stability. By developing local infrastructure for crafts, education, and healthcare, the project supports economic growth and reduces reliance on distant resources, fostering regional self-sufficiency and resilience. On a broader national scale, these efforts align with Pakistan's goals for sustainable development by promoting biodiversity

	conservation, ecosystem restoration, and sustainable land use. This holistic approach will not only address immediate and long-term challenges but also contribute to national climate adaptation strategies, economic stability, and environmental sustainability, reinforcing Pakistan's commitment to comprehensive and resilient development.
b	**Environmental Aspect** (e.g. carbon reduction, energy-efficient, etc.) The project supports carbon reduction and energy efficiency through the integration of green infrastructure, such as rain gardens and native plant buffers, which sequester carbon and improve air quality. Additionally, the use of sustainable materials and local construction practices reduces the carbon footprint of transportation and manufacturing. Passive design features, like elevated plinths and shaded communal areas, minimize the need for artificial cooling and heating, further enhancing energy efficiency. These measures collectively contribute to lowering greenhouse gas emissions and promoting a more sustainable built environment.
c	**Cost Reduction of Existing Product** The loss and disastrous impacts of flooding on health, food, crops, dwellings, cattle's, and that is also very frequent, in every 3 years flood hits the settlement, therefore in long run the loss is much more than the cost spent on the implementation of design solutions, and even the solutions are local, materials are locally available, the people know the labor work, using local techniques, the overall cost of the project would be decreased automatically.
d	**Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process (e.g. What is the issue is current process and what improvement you suggests)** The current situation in Ramzan Rajar is marked by inadequate flood management, inefficient infrastructure, limited economic opportunities, poor health and sanitation, and
	environmental degradation. The proposed project addresses these issues by introducing advanced flood resilience strategies, climate-responsive and energy-efficient design, and sustainable local infrastructure. It enhances economic opportunities through dedicated spaces for local crafts and tourism, improves health with better sanitation and clean water access, and restores ecosystems with green infrastructure. These improvements lead to reduced costs, increased resilience, and a more sustainable and self-sufficient community.
e	**Expanding of Market share** (e.g. how it expand and what is the problem with the current market The project will reduce dependence on the mainland economy by fostering local self-sufficiency through the development of infrastructure for local crafts, businesses, and tourism. By providing dedicated spaces for local artisans, shops, and tourism facilities, the project empowers the community to generate income locally and reduces reliance on external resources. Additionally, it supports economic growth through improved local production and services, thereby stimulating regional economic activity. On a national level, the project contributes to the broader economy by boosting local entrepreneurship, attracting tourism revenue, and reducing the strain on national resources, ultimately enhancing economic stability and growth across the country.

f	**Capture New Market** (e.g. Niche market or unaddressed segment) The project captures new market opportunities by focusing on niche segments such as local crafts and artisanal products, which attract consumers seeking unique, handcrafted items. It also develops cultural and eco-tourism attractions to draw visitors interested in authentic experiences. By providing essential community services like schools and healthcare centers, it addresses underserved segments, and promotes sustainable living to appeal to environmentally conscious consumers. These initiatives open up previously untapped markets, boosting local economic activity and positioning Ramzan Rajar as a distinctive destination for both residents and visitors.	
7	**Target Market (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service)** The project targets local artisans and craftspeople by providing infrastructure to enhance their production and market reach. It attracts tourists through the development of cultural and eco-tourism facilities. Local families benefit from improved infrastructure, essential services, and flood resilience. Students gain access to better educational facilities, while small business owners and community organizations receive support through new commercial and multipurpose spaces. Agricultural workers benefit from enhanced flood resilience and water management. This comprehensive approach aims to boost economic opportunities, improve quality of life, and support a vibrant, self-sufficient community.	
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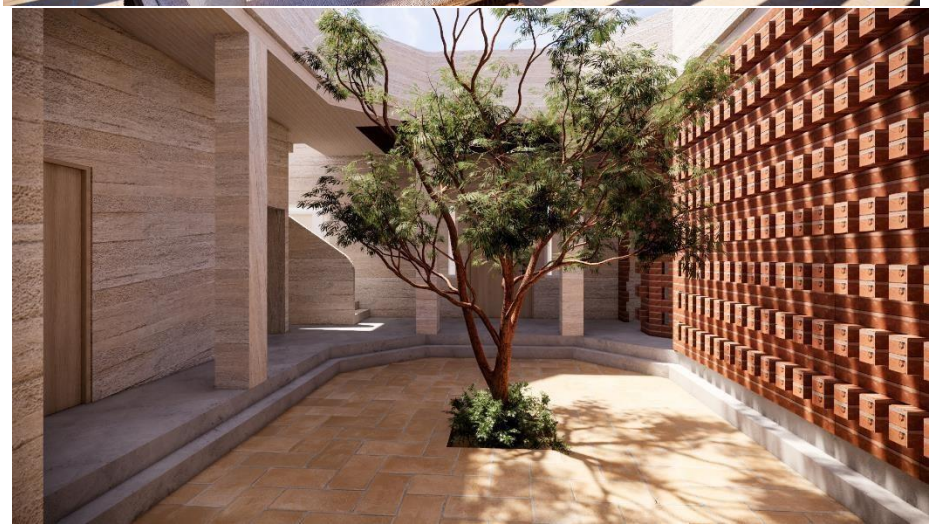


1 Flood plain
2 Green buffer
3 Sub surface drainage
4 Water catchment ponds
5 Embankment
6 Swales
7 Rain Gardens
8 Raised Plinth level
9 Permeability
10 Sand filtration