

SITUATIONAL ANALYSIS AND COMMUNITY-BASED VULNERABILITY ASSESSMENT IN SUKKUR DISTRICT, SINDH



Title of Study : **Situational Analysis and Community-Based Vulnerability Assessment In Sukkur District, Sindh**

Project Name : Localized Multihazard Flood Anticipatory Actions in Pakistan
2024 District Sukkur, Sindh

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List of Acronyms and Abbreviations

AC	Assistant Commissioner
DDMA	District Disaster Management Authority
DRR	Disaster Risk Reduction
DC	Deputy Commissioner
EWS	Early Warning System
IBA	Institute of Business Administration
INGO	International Non-Governmental Organization
JUI	Jamiat Ulema-e-Islam
MFI	Microfinance Institution
NGO	Non-Governmental Organization
PAF	Pakistan Air Force
PDMA	Provincial Disaster Management Authority
PWD	Persons with Disabilities
SPHF	Sindh Provincial Housing Fund
UC	Union Council
UNDP	United Nations Development Programme
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization
WASH	Water, Sanitation, and Hygiene
FAO	Food and Agriculture Organization
SEPCO	Sukkur Electric Power Company
WB	World Bank
NHA	National Highway Authority
LHV	Lady Health Visitor
PHC	Primary Health Care
IDP	Internally Displaced Person
ILO	International Labour Organization
CBO	Community-Based Organization
NDRMF	National Disaster Risk Management Fund
SMEDA	Small and Medium Enterprises Development Authority

Foreword

The Community Development Foundation (CDF) is honored to present this comprehensive report with support of Action Against Hunger (ACF) and Welthunger Hilfe (WHH) on the Situational Analysis and Community-Based Vulnerability Assessment in Sukkur District, Sindh. This report is a testament to the collective efforts and dedication of numerous stakeholders committed to enhancing the resilience of our communities in the face of natural disasters.

We are also profoundly grateful to our esteemed partners and supporters, without whom this project would not have been possible. Welthungerhilfe (WHH), Action Against Hunger, and German Humanitarian Assistance have provided invaluable support throughout this endeavor. Their commitment to humanitarian aid and community development has been instrumental in driving this initiative forward, and their collaboration has strengthened our collective capacity to respond to the challenges posed by floods and other natural disasters.

As we move forward, we hope that the findings and recommendations of this report will serve as a guiding light for policymakers, NGOs, and community leaders. It is our collective responsibility to ensure that the lessons learned from this assessment are translated into meaningful actions that protect and empower the people of Sukkur.

We extend our deepest appreciation to IRIS Education and Training Services for their exceptional leadership and unwavering commitment to this vital project. The IRIS team has demonstrated remarkable expertise and dedication, meticulously gathering data, engaging with communities, and providing actionable insights that will undoubtedly contribute to the betterment of Sukkur District. Their tireless efforts have ensured that the voices of the most vulnerable are heard, and their needs are addressed with empathy and precision.

Together, we can build a more resilient and sustainable future for all.

Sincerely,

Muhammad Jan Odhano

Chief Executive Officer
Community Development Foundation (CDF)

Acknowledgments

This report on the Situational Analysis and Community-Based Vulnerability Assessment in Sukkur District, Sindh, is the result of the collective efforts of many dedicated individuals and organizations.

Special thanks to our partners and supporters—**Welthungerhilfe (WHH)**, **Action Against Hunger**, and **German Humanitarian Assistance**—for their unwavering technical support and collaboration, which made this project possible.

We also acknowledge the invaluable contributions of local community members and leaders in Sukkur, whose insights and experiences were crucial to our findings. Additionally, we thank the government agencies, NGOs, and all stakeholders who participated in and supported this assessment.

We extend our deepest gratitude to **IRIS Education and Training Services** for their outstanding leadership in conducting this assessment. Their dedication to thorough research and community engagement has been pivotal in highlighting the vulnerabilities faced by the people of Sukkur. Finally, we appreciate the hard work of everyone involved behind the scenes, including data collectors, analysts, and support staff, whose efforts were essential to the successful completion of this report.

Together, we hope this report will guide more effective disaster management and contribute to a safer, more resilient future for Sukkur District.

Executive summary

Background of Study

The Community Development Foundation (CDF), with support from Action Against Hunger (ACF), is undertaking the "Localized Multihazard Flood Anticipatory Actions in Pakistan – 2024 District Sukkur, Sindh" project. This initiative aims to enhance flood preparedness in Sukkur district through a comprehensive situational analysis and community-based vulnerability assessment. To achieve this, CDF has engaged the Institute for Research and Integrated Sustainability (IRIS) Education and Training services, a firm renowned for promoting sustainable development through high-quality research, training, education, and career management services. This study provides a comprehensive analysis of the vulnerabilities and challenges faced by the population of Sukkur District, Sindh, during floods, focusing on social, economic, and infrastructural factors that exacerbate these risks. The Situational Analysis and Community-Based Vulnerability Assessment aims to understand the region's susceptibility to floods, identify key areas of risk, and offer targeted recommendations to improve disaster management and community resilience.

Methodology Adopted

The research employs a deductive approach, as it begins with a review of existing data, followed by fieldwork and analysis to test pre-established hypotheses. The study is qualitative and exploratory in nature, focusing on understanding flood vulnerability in Sukkur district through community engagement and data analysis. The data collected during fieldwork was compiled and cleaned for analysis. We used qualitative data coding techniques to categorize and analyze responses from FGDs and KIIs. Statistical analysis was performed on quantitative data to identify trends and patterns, which were then cross-referenced with historical data and socio-economic profiles. We conducted a trend analysis focusing on flood risk and vulnerability, identifying key factors contributing to flood susceptibility and pinpointing high-risk areas and populations most vulnerable to flooding.

Key Findings of the Study

Social Vulnerabilities: Women, children, the elderly, and persons with disabilities (PWD) are disproportionately affected by floods. Women face heightened risks of gender-based violence and struggle with access to essential sanitary resources. Children experience disruptions in education and psychosocial trauma, and the elderly suffer from limited mobility, disrupted healthcare, and increased mortality rates. PWD encounter significant barriers in evacuation and access to services due to both physical and social challenges.

Economic and Infrastructural Vulnerabilities: Sukkur's economy, heavily reliant on agriculture, faces severe setbacks during floods, resulting in destroyed crops, food insecurity, and financial instability. Essential infrastructure, including roads, healthcare facilities, and schools, is often damaged, making emergency response and recovery efforts difficult. While the Sukkur Barrage plays a key role in irrigation, it does not adequately mitigate flood risks, especially in rural areas.

Disaster Management Gaps: The district suffers from a lack of awareness regarding disaster management policies and has an underdeveloped disaster management framework. Poor

coordination between government agencies, NGOs, and community groups, combined with the absence of comprehensive disaster management plans, exacerbates flood risks and weakens the community's resilience.

Recommendations

Strengthen Disaster Preparedness: Develop robust early warning systems and improve communication strategies to ensure timely and effective responses to floods. Establish better coordination mechanisms among government agencies, NGOs, and local communities to improve emergency response efficiency.

Targeted Social Interventions: Implement specific interventions to address the vulnerabilities of women, children, the elderly, and PWD. These should include accessible shelters, gender-sensitive sanitary facilities, specialized medical care, and support services that cater to the unique needs of these groups.

Infrastructure Resilience: Invest in improving the resilience of critical infrastructure, especially in rural areas. Roads, schools, healthcare facilities, and other essential services should be designed to withstand floods, and disaster risk reduction should be integrated into both urban and rural planning.

Economic Support and Recovery: Introduce programs aimed at agricultural recovery and livelihood restoration. These should include financial support and capacity-building initiatives to strengthen the economic resilience of flood-affected communities and help them recover more quickly.

Conclusion

The study highlights the acute vulnerabilities faced by communities in Sukkur during floods, particularly among women, children, the elderly, and PWD. The combination of social, economic, and infrastructural weaknesses amplifies the negative impact of floods, with limited disaster management and preparedness further exacerbating the situation. Addressing these vulnerabilities requires a multi-faceted approach, including stronger disaster preparedness systems, targeted social interventions, infrastructure resilience, and economic support programs. By implementing these recommendations, Sukkur can improve its resilience to floods and reduce the social and economic hardships faced by its communities.

1. Introduction

The purpose of the Situational Analysis and Community-Based Vulnerability Assessment in Sukkur District, Sindh, is to thoroughly investigate the factors that contribute to the region's vulnerability to floods and other natural disasters. This comprehensive report will provide an in-depth overview of the current situation in Sukkur, examining the socio-economic conditions, demographic characteristics, infrastructure status, and the effectiveness of existing disaster management mechanisms. Through this analysis, the report seeks to identify the key vulnerabilities and strengths within the community, offering a foundation for informed and targeted interventions, as well as policy recommendations.

The assessment will probe into the specific vulnerabilities in Sukkur, such as socio-economic disparities, geographic location, housing quality, and access to essential services, to identify and prioritize the populations and areas most at risk from floods. A historical and contextual analysis will also be conducted, reviewing the history of flooding in Sukkur, detailing past flood events, their impacts, and the community's responses, while also considering the district's geographical and climatic factors that contribute to flood risks.

Moreover, the report will include a socio-economic and demographic assessment, analyzing factors like income levels, employment rates, education, healthcare, and population distribution in Sukkur. This analysis will explore how these socio-economic factors intersect with and exacerbate flood vulnerability. The quality and accessibility of critical infrastructure, such as roads, bridges, healthcare facilities, and schools, will also be assessed, alongside an evaluation of public services, including disaster response systems, early warning mechanisms, and social safety nets.

The assessment will further gather insights into community perceptions, experiences, and coping strategies related to floods, with a focus on traditional knowledge and local resilience initiatives. A review of the existing policy and institutional framework for disaster management in Sukkur will be conducted, identifying gaps and opportunities for improving flood management efforts.

Ultimately, the report will synthesize this data to pinpoint the most vulnerable populations and areas, while also identifying the strengths that can be leveraged for resilience-building. It will provide practical, context-specific recommendations aimed at reducing vulnerability and enhancing community resilience. These recommendations will cover infrastructure improvements, policy adjustments, capacity-building initiatives, and strategies for community engagement. Additionally, the report will contribute to policy and planning processes by offering evidence-based analysis to improve disaster management, reduce flood risks, and promote sustainable development in Sukkur.

1.1. Methodology

The methodology for this project was executed through five distinct phases, each tailored to achieve specific tasks and objectives.

Phase 1: Planning and Preparation

The project commenced with a kickoff meeting and briefing with the Community Development Foundation (CDF) and the Action Against Hunger (ACF). In this meeting, we confirmed the project's objectives, deliverables, timelines, and roles and responsibilities. The scope of work and expected outcomes were finalized, and communication protocols along with reporting schedules were established. Following this, resources were allocated, with personnel, equipment, and logistics assigned to the project. A detailed project plan, including a Gantt chart

outlining key activities and milestones, was prepared. Additionally, a comprehensive timeline for all phases of the project was developed, identifying critical milestones and deliverables.

Phase 2: Desk Review

In the second phase, we conducted a thorough desk review. Historical flood data for the Sukkur district was gathered from various sources, including government records, NGO reports, academic studies, and meteorological data. Socio-economic data relevant to the district was also compiled, focusing on demographics, economic activities, health, education, and infrastructure. We analyzed existing reports and studies on flood risks and vulnerabilities in Sukkur, identifying key findings, knowledge gaps, and best practices from previous flood management initiatives. A preliminary analysis was then carried out to identify potential hotspots for flood vulnerability, and an initial framework for the fieldwork phase was developed, outlining key areas of focus and hypotheses to be tested.

Phase 3: Fieldwork

During the fieldwork phase, we identified diverse communities and areas within the Sukkur district with varying levels of flood risk. Criteria for site selection were developed to ensure representation of different socio-economic groups and geographical features. We created a detailed community engagement plan to engage with community members, local leaders, and other stakeholders. Participatory methods such as Focus Group Discussions (FGDs), Key Informant Interviews (KIIs) and participatory mapping were designed and implemented. Field visits were conducted at the selected sites, where we collected qualitative and quantitative data on vulnerabilities, capacities, and existing infrastructure. Our assessment included evaluating early warning systems and disaster preparedness measures, and we documented community insights, experiences, and suggestions for improving flood resilience.

Phase 4: Data Analysis

The data collected during fieldwork was compiled and cleaned for analysis. We used qualitative data coding techniques to categorize and analyze responses from FGDs and KIIs. Statistical analysis was performed on quantitative data to identify trends and patterns, which were then cross-referenced with historical data and socio-economic profiles. We conducted a trend analysis focusing on flood risk and vulnerability, identifying key factors contributing to flood susceptibility and pinpointing high-risk areas and populations most vulnerable to flooding.

Phase 5: Reporting and Presentation

The final phase involved preparing a draft report that summarized the preliminary findings from the desk review and field data collection. This report included vulnerability maps, data visualizations, and initial recommendations. The draft was presented to CDF, ACF, and other stakeholders for review, and their feedback was incorporated into the final report. The comprehensive report was finalized with detailed analysis, vulnerability maps, and actionable recommendations for flood anticipatory actions. We developed a presentation summarizing key findings and recommendations, using visual aids such as slides and infographics to facilitate understanding and engagement during the presentation to stakeholders. Throughout the project, we ensured that all information remained confidential as per the Non-Disclosure Agreement (NDA) with CDF, and maintained regular communication with the CDF project team through meetings and progress updates.

2. Profile of Sukkur District

Sukkur District is located in the northern part of Sindh province, Pakistan, along the western bank of the Indus River. It is bordered by Shikarpur, Khairpur, and Ghotki districts. The district experiences an arid climate characterized by hot summers and mild winters. Sukkur's geographical location makes it prone to both droughts and floods, which significantly impact the local population and economy. The district has a rich historical and cultural heritage, with notable landmarks such as the Sukkur Barrage and various historical sites. Historically, Sukkur has been an important trade and agricultural hub due to its proximity to the Indus River.

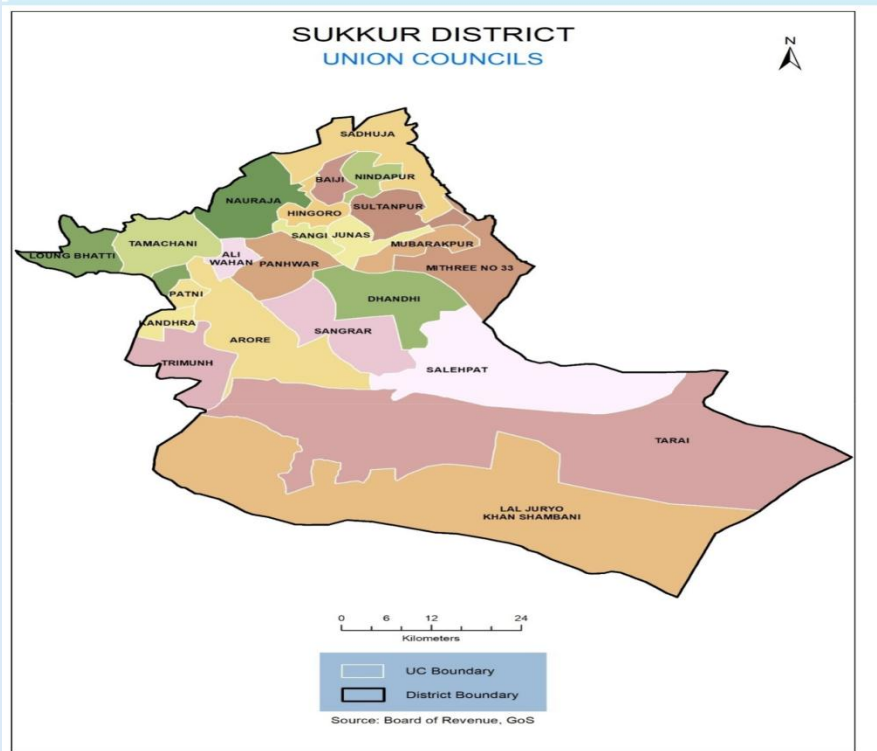
The estimated population of Sukkur district is around 1.5 million, (Sindh B. o., 2022)¹ with a mix of urban and rural residents, the majority of whom live in rural areas. Sukkur city, the main urban center, serves as a significant commercial and industrial hub. The district's diverse demographic includes various ethnic and cultural groups. Sukkur's economy is primarily agrarian, particularly in rural areas where agriculture is the main livelihood, with major crops including wheat, rice, and cotton. In contrast, urban areas like Sukkur city offer more diverse economic opportunities in trade, services, and small-scale industries, leading to generally higher income levels compared to rural areas.

Access to basic services varies significantly between urban and rural areas. Urban centers like Sukkur city have better access to healthcare, education, clean drinking water, and sanitation facilities, while rural areas often face challenges in these aspects. Major healthcare services, educational institutions such as Sukkur IBA University, and other key infrastructure are concentrated in urban areas. Sukkur is well-connected by road and rail, enhancing its role as a commercial hub. The Sukkur Barrage is a critical infrastructure for irrigation and transportation. However, rural areas still face issues like power shortages and load shedding, despite ongoing efforts to improve energy infrastructure in the district.

The proximity to the Indus River makes Sukkur vulnerable to flooding, particularly during the monsoon season. Past floods have caused significant damage to agriculture, infrastructure, and homes, highlighting the need for effective flood management strategies. Communities in Sukkur have developed various coping mechanisms, including traditional knowledge, community-based disaster risk management practices, and reliance on early warning systems. Government and non-governmental organizations (NGOs) also play a crucial role in flood management and relief efforts, providing essential support to affected populations.

Administratively, Sukkur district is divided into several talukas (sub-districts) and union councils, each responsible for local governance and development activities. The district administration oversees various functions, ensuring the implementation of development projects and the provision of essential services. Multiple government departments and institutions are involved in flood management, agricultural support, health, education, and infrastructure development, working together to enhance the resilience and well-being of the population.

1. *Sindh Bureau of Statistics (Development statistics of Sindh) 2021.*



Map 1. Showing Sukkur district boundary areas (of Union councils)

i. GEOGRAPHY

Category	Details
District Area	5,062 Sq. Km
Coordinates	Longitude: 68° 30' 35" to 69° 00' 48" East Latitude: 27° 00' 04" to 28° 15' 02" North
Surrounding Districts	- North: Kashmore - North West: Shikarpur - South West: Khairpur - East: Ghotki and India
Climate Conditions	Hot and Arid
Coldest Month	January
Hottest Month	June
Seasonal Temperatures	- Spring (March and April): Max Mean: 37.62°C, Min Mean: 20.75°C - Dry Summer (May and June): Max Mean: 44.92°C, Min Mean: 29.37°C - Wet Summer (July to September): Max Mean: 41.81°C, Min Mean: 29.14°C - Autumn (October to November): Max Mean: 35.08°C, Min Mean: 19.25°C - Winter (December to February): Max Mean: 26.17°C, Min Mean: 10.61°C
Average Rainfall	96.5 mm/year
Physiographic Features	River Indus

Table 1. Showing Geography of District Sukkur Multi-Hazard Vulnerability Risk Assessment (MHVRA) PDMA Sindh. 2022

ii. Administrative Structure

No	Taluka New Sukkur	No.	Taluka PANO AKIL	No	Taluka ROHRI	No	Taluka Sukkur city	No.	Taluka Saleh Pat
	UC		UC		UC		UC		Uc
1	BACHAL SHAH MIANI	1	BAIJI SHARIF	1	AKBARPUR	1	ADAM SHAH COLLONY	1	LAL JURIO SHABANI
2	BAGARJI	2	DADLOI	2	ALI WAHAN	2	AYUB GATE	2	SALEH PAT
3	CHOONA BHATHA	3	HINGORO	3	ARORE	3	BARRAGE COLONY	3	TARAI
4	DARGAH BADAL FAQEER	4	JUNAS	4	BEDIL BEKAS	4	CLOCK TOWER		
5	HUSSAIN ARAIN	5	MEHRAN	5	DHANDHI	5	DARGAH QAZI BABA		
6	NASEERABAD	6	MUBARK PUR	6	KANDHRA	6	GHARIB ABAD		
7	NEW PIND	7	NINDAPUR	7	KOTRI	7	JEA SHAH		
8	PIR MURAD SHAH	8	NOURAJA	8	LOUNG BHATTI	8	JINNAH CHOWK		
9	RAHOOJA	9	PANO AKIL	9	PANHWAR	9	MAKKI SHAH		
10	SAEEDABAD	10	SADHUJA	10	PATNI	10	MASOOM SHAH		
11	SMALL INDUSTRIES	11	SANGI	11	PIR IKHLAS ALI SHAH	11	NEW GOTH		
12	SOCIETY	12	SULTAN PUR	12	ROHRI	12	OLD SUKKUR		
13	TAMACHANI			13	ROSHANABAD	13	PIR ILLAHI BUX		
				14	SANGRAR	14	SHAH LATIF		
				15	TRIMONH	15	SHAIKH SHEENH		
				16	WAH BURIRA	16	SHAMS ABAD		

Table 2 Administrative structure of District Sukkur (Sukkur, 2024)

iii. Demographics and Population of Sukkur

Sukkur, a major district in Sindh province, boasts a rich and diverse demographic profile. According to the latest data from the Bureau of Statistics Sindh, Sukkur has an estimated population of approximately 1.5 million people. This population is distributed across both urban and rural areas, with the urban population concentrated primarily in Sukkur city, which serves as the administrative and economic hub of the district.

POPULATION BY DISTRICT AND TALUKA BY SEX (RURAL/URBAN) IN SINDH, 2017 (CENSUS)												
District/ Taluka	Rural				Urban				Total			
	T o t a l	M a l e	F e m a l e	T r a n s g e n d e r*	T o t a l	M a l e	F e m a l e	T r a n s g e n d e r*	T o t a l	M a l e	F e m a l e	T r a n s g e n d e r*
2017												
1	2	3	4	5	6	7	8	9	10	11	12	13
SUKKUR DISTRICT	767	399	368	65	722	377	345	93	1,489	776	713	158
New Sukkur	44	23	21	2	277	143	134	39	321	166	155	41
Rohri	284	148	136	29	86	44	42	5	370	192	178	34
PanoAkil	336	174	162	27	100	57	43	15	436	231	205	42
Salehpata	103	54	49	7	27	14	13	2	130	68	62	9
Sukkur City	-	-	-	-	232	119	113	32	232	119	113	32

Table 3 Showing population of Sukkur District, Bureau of statistics Government of Sindh 2021

Urban Population:

Sukkur city, the largest urban center in the district, is home to a significant portion of the population. It is a bustling city with a vibrant economy, diverse communities, and extensive infrastructure. The urban population enjoys relatively better access to education, healthcare, and employment opportunities compared to their rural counterparts. The city's demographic composition includes a mix of ethnic groups, with Sindhis being the predominant ethnic community, followed by Baloch, Punjabis, and Urdu-speaking migrants. This diversity contributes to the cultural richness of Sukkur, reflected in its festivals, languages, and social practices.

Rural Population:

The rural areas of Sukkur district are characterized by a more homogenous population, primarily comprising Sindhi-speaking communities. These areas are predominantly agrarian, with agriculture serving as the main source of livelihood. The rural population is spread across numerous villages and small towns, with varying levels of access to basic services and infrastructure. Life in rural Sukkur is closely tied to the rhythms of agricultural seasons, with significant portions of the population engaged in farming, livestock rearing,

and related activities.

Population Density:

Population density in Sukkur varies significantly between urban and rural areas. Sukkur city, with its high concentration of residents and businesses, has a much higher population density compared to the sparsely populated rural hinterlands. This disparity in population density has implications for service delivery, infrastructure development, and economic opportunities. Urban areas, being more densely populated, tend to attract more investment in infrastructure and services, while rural areas often face challenges in accessing basic amenities.

Age and Gender Composition:

The age distribution of Sukkur's population reveals a relatively young demographic profile, with a substantial proportion of the population under the age of 30. This youthful demographic presents both opportunities and challenges for the district. On the one hand, a young population can be a driver of economic growth and innovation. On the other hand, it necessitates substantial investment in education, healthcare, and employment opportunities to harness this potential.

Gender composition in Sukkur is fairly balanced, with a slightly higher number of males compared to females, which is consistent with national trends. However, gender disparities exist in terms of access to education, healthcare, and economic opportunities, particularly in rural areas. Women in Sukkur, especially in rural communities, often face cultural and social barriers that limit their participation in public life and decision-making processes.

Ethnic and Linguistic Diversity:

Sukkur's demographic profile is enriched by its ethnic and linguistic diversity. While Sindhis constitute the majority, the district is also home to significant numbers of Baloch, Punjabis, and Urdu-speaking migrants. This diversity is reflected in the linguistic landscape of Sukkur, where Sindhi is the predominant language, followed by Balochi, Punjabi, and Urdu. The presence of multiple ethnic and linguistic groups contributes to the cultural vibrancy of Sukkur, evident in its festivals, cuisine, and social customs.

Migration Patterns:

Sukkur has experienced various migration patterns over the years, influenced by economic opportunities, social factors, and natural disasters. Urban migration has been a significant trend, with people from rural areas moving to Sukkur city in search of better employment prospects, education, and healthcare. Additionally, the district has seen inward migration from other parts of Sindh and Pakistan, further contributing to its demographic diversity. Conversely, rural-urban migration has also posed challenges, such as increased pressure on urban infrastructure and services.

Social Structure:

The social structure of Sukkur is marked by a mix of traditional and modern elements. While urban areas exhibit a more modern social fabric with nuclear families and diverse occupational patterns, rural areas are characterized by extended family systems, traditional lifestyles, and agriculture-based occupations. Social networks and community organizations play a crucial role in both urban and rural settings, providing support and fostering social cohesion.

iv. Economy (Sindh B. o., 2022)

Category	Details
Industries	- Food Products and Beverages - Manufacture of Textiles
Agriculture	Production in M.tons (2016-17)
Major Crops	- Sugarcane: 472,585 M.tons - Cotton: 34,556 M.tons - Wheat: 171,561 M.tons
Minor Crops	- Bajra: 10 M.tons - Rapeseed and Mustard: 344 M.tons - Barley: 10 M.tons - Sesame: 30 M.tons - Maize: 177 M.tons - Gram: 461 M.tons - Jowar: 1,815 M.tons - Tobacco: 21 M.tons

Table 4 Showing Economy of Sukkur District, Bureau of statistics Government of Sindh 2021

v. Poverty Levels

Sukkur District, like many other regions in Sindh, faces significant challenges related to poverty. The poverty levels in Sukkur vary widely between urban and rural areas, with rural communities bearing the brunt of economic hardships. In rural Sukkur, a substantial proportion of the population lives below the poverty line, struggling to meet basic needs such as food, shelter, and healthcare. The lack of access to education and employment opportunities exacerbates the cycle of poverty in these areas.

Poverty in Sukkur is multidimensional, affecting various aspects of life, including health, education, and living conditions. In rural areas, poverty is closely tied to the agrarian economy, where fluctuations in crop yields, water availability, and market prices can have a direct impact on household incomes. The reliance on agriculture as the primary source of income makes these communities particularly vulnerable to economic shocks, such as floods, droughts, and pest infestations.

In urban Sukkur, poverty manifests differently. While the city has a more diverse economy and better access to services, significant portions of the urban population still live in poverty, particularly in informal settlements and slum areas. These urban poor often work in low-paying, informal jobs with little job security and few benefits. The cost of living in the city, combined with limited access to affordable housing, healthcare, and education, further entrenches poverty among these communities.

vi. Urban Livelihoods:

In urban areas like Sukkur city, livelihoods are more diversified. The city serves as a commercial hub, with a vibrant market economy that includes retail, wholesale trade, and services. Small and medium-sized enterprises (SMEs) are prevalent, providing employment in sectors such as textiles, food processing, and construction. The informal sector also plays a crucial role in the urban economy, with many people engaged in street vending, day labor, and other forms of informal work.

Despite the availability of a wider range of employment opportunities in the city, urban livelihoods in Sukkur are not without challenges. The informal sector, while providing a livelihood for many, is characterized by low wages, poor working conditions, and a lack of

social protection. Furthermore, the competition for jobs in the formal sector is intense, with many young people, particularly those from rural areas, struggling to find stable employment due to a lack of relevant skills and education.

vii. Gender and Livelihoods:

Gender plays a significant role in determining livelihood opportunities in Sukkur. Women, particularly in rural areas, have limited access to economic opportunities and are often confined to unpaid domestic work or low-paying jobs in agriculture. Cultural norms and social barriers restrict women's participation in the labor market, and those who do work often face discrimination and exploitation. In urban areas, women have slightly better access to employment, particularly in the education, healthcare, and service sectors, but gender disparities in wages and working conditions persist.

viii. Impact of Natural Disasters on Livelihoods:

Natural disasters, particularly floods, have had a devastating impact on livelihoods in Sukkur. The district is prone to flooding due to its location along the Indus River, and recurrent floods have led to the loss of crops, livestock, and infrastructure. These disasters not only destroy livelihoods in the short term but also have long-term economic impacts, as affected communities struggle to recover and rebuild. The frequent occurrence of floods has led to a cycle of poverty, where households are unable to accumulate savings or invest in improving their livelihoods due to the constant threat of disaster.

ix. Seasonal Patterns:

Flooding in Sukkur is closely linked to the monsoon season, which typically spans from June to September. During this period, heavy rainfall in the catchment areas of the Indus River results in increased water flow, often leading to the river breaching its banks. The intensity and duration of monsoon rains can vary significantly each year, making flood prediction and management challenging.

In addition to monsoon-related flooding, Sukkur is also at risk of floods caused by the release of water from upstream reservoirs and dams. These releases are sometimes necessary to manage reservoir levels and prevent dam overflow, but they can lead to sudden and severe flooding downstream.

x. Agriculture & Irrigation

Agriculture is the backbone of the economy in rural Sukkur. The fertile lands along the Indus River support the cultivation of a variety of crops, including wheat, rice, cotton, and sugarcane. The agricultural sector employs a significant portion of the rural population, with many households engaged in farming, either as landowners or tenant farmers. In addition to crop farming, livestock rearing is also an important source of income for rural families, providing meat, milk, and other products that are either consumed locally or sold in markets.

However, the agricultural sector in Sukkur faces numerous challenges that affect livelihoods. These include water scarcity due to inefficient irrigation systems, land degradation, and the impact of climate change, which has led to irregular rainfall patterns and extreme weather events. Additionally, smallholder farmers often lack access to credit, modern farming equipment, and high-quality seeds, limiting their productivity and ability to improve their living standards.

xi. Sukkur Barrage and Canal Systems:

The Sukkur Barrage, constructed in the early 1930s, is one of the most significant flood management infrastructures in the region. It serves as a critical component of the Indus River's irrigation and flood control system. The barrage, along with its associated network of canals, regulates the flow of water in the Indus River, diverting excess water into various canals to prevent the river from breaching its banks during periods of high flow.

The barrage's primary function is irrigation, but it also plays a vital role in flood control by managing the water levels in the river. During the monsoon season, when the risk of flooding is highest, the barrage's gates can be adjusted to release excess water downstream or into the canal system. This helps prevent flooding in upstream areas and controls the flow of water to minimize damage to downstream communities.

However, the effectiveness of the Sukkur Barrage in flood management is often challenged by the age of the infrastructure and the need for regular maintenance and upgrades. The barrage has been subject to wear and tear over the decades, and its ability to manage increasingly erratic monsoon patterns and rising water levels is sometimes limited. Periodic maintenance and infrastructure enhancements are critical to ensuring the barrage continues to function effectively as a flood management tool.

xii. Embankments and Levees:

In addition to the Sukkur Barrage, embankments and levees have been constructed along the Indus River and its tributaries to protect vulnerable areas from flooding. These earthen embankments are designed to prevent the river from overflowing into agricultural lands, villages, and urban centers during high water events. They are especially critical in protecting the Kacha areas, which are more prone to flooding.

While these structures provide a certain level of protection, they are not without limitations. The embankments are often vulnerable to breaches, especially during periods of sustained high-water levels or when maintenance has been inadequate. The strength and integrity of these embankments are crucial, and any failure can lead to catastrophic flooding in the areas they are meant to protect.

Moreover, the construction and maintenance of these embankments require significant resources and coordination among various governmental agencies. Regular inspections and timely repairs are necessary to maintain their effectiveness. In many cases, however, resource constraints and bureaucratic delays have hampered the proper upkeep of these vital flood defense structures.

2.1 Access to Basic Services in Sukkur

Access to basic services such as education, healthcare, water, sanitation, and electricity is crucial for the well-being and development of any region. In Sukkur, the availability and quality of these services vary significantly between urban and rural areas, often reflecting broader socio-economic disparities.

2.1.1 Education:

Education is one of the most critical basic services, and Sukkur's educational landscape is marked by both progress and challenges. In urban areas, particularly in Sukkur city, there is relatively better access to educational facilities, including primary, secondary, and higher education institutions. The city hosts a number of public and private schools, colleges, and universities, offering a range of educational opportunities. However, the quality of education can vary widely between institutions, with private schools generally providing better facilities and teaching standards than their public counterparts.

In rural areas, access to education is more limited. Many villages have only primary schools, and even these are often under-resourced, with inadequate infrastructure, a shortage of qualified teachers, and a lack of essential learning materials. Secondary education facilities are sparse, forcing students to travel long distances to attend school, which can be a significant barrier, particularly for girls. Dropout rates are high in rural areas, with many children leaving school to work in agriculture or due to socio-cultural factors that deprioritize education.

NO. OF INSTITUTIONS, ENROLMENT AND TEACHING STAFF BY SEX IN DISTRICT SUKKUR FOR YEAR 2019-20 (Government of Sindh, 2022)

INSTITUTIONS	No. of Institutions			Enrolment			Teaching Staff		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
NON-PROFESSIONAL COLLEGES	9	6	3	18,911	10,630	8,281	345	242	103
Intermediate	-	-	-	-	-	-	-	-	-
Degree	7	4	3	14,253	6,431	7,822	229	127	102
Post Graduate	2	2		4,658	4,199	459	116	115	1
PROFESSIONAL COLLEGES/INSTITUTES	6	5	1	995	531	464	139	103	36
Medical	1	1	-	510	216	294	99	72	27
Homoeopathic	1	1	-	86	70	16	7	4	3
Tibbia	-	-	-	-	-	-	-	-	-
Engineering & Technology	-	-	-	-	-	-	-	-	-
Law	2	2	-	245	221	24	17	14	3
Home Economics	-	-	-	-	-	-	-	-	-
Physical Education									
Commerce	-	-	-	-	-	-	-	-	-
Teacher's Training(Degree Level)									
Teacher's Training(Below Degree Level)	2	1	1	154	24	130	16	13	3
TECHNICAL INSTITUTIONS	10	5	5	1,678	1,460	218	76	58	18
Technical Colleges	-	-	-	-	-	-	-	-	-
Polytechnic Institutions	2	1	1	1,019	961	58	40	36	4
Monotechnic Institutions	1	1	-	387	387	-	5	5	-
Commercial Institutions	2	2	-	36	36	-	10	10	-
Vocational Institutions and Vocational Schools	5	1	4	236	76	160	21	7	14

Table 5 No. Of Institutions, Enrolment And Teaching Staff By Sex In District Sukkur For Year 2019-20 Bureau of statistics

School Education Data (Institutions, Enrollment and teaching staff) by sex and

Location	LEVEL	INSTITUTIONS				ENROLMENT			TEACHING STAFF		
		TOTAL	MALE	FEMALE	MIXED	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Rural	Primary	110	15	16	79	24,937	13,877	11,060	620	396	224
	Middle	8	1	1	6	2,257	1,437	820	67	38	29
	Elementary	18	2	6	10	5,806	3,207	2,599	260	128	132
	High	31	12	9	10	21,283	11,322	9,961	861	529	332
	Hi. Secondary	5	-	3	2	7,244	3,280	3,964	194	65	129
	GRAND TOTAL	172	30	35	107	61,527	33,123	28,404	2,002	1,156	846
Urban	Primary	994	188	124	682	80,632	49,416	31,216	1,572	1,337	235
	Middle	28	4	9	15	3,040	1,956	1,084	93	71	22
	Elementary	35	1	7	27	8,247	4,857	3,390	185	137	48
	High	38	9	7	22	22,129	15,520	6,609	510	389	121
	Hi. Secondary	8	2	2	4	10,664	7,401	3,263	207	147	60
	GRAND TOTAL	1,103	204	149	750	124,712	79,150	45,562	2,567	2,081	486
Total	Primary	1,104	203	140	761	105,569	63,293	42,276	2,192	1,733	459
	Middle	36	5	10	21	5,297	3,393	1,904	160	109	51
	Elementary	53	3	13	37	14,053	8,064	5,989	445	265	180
	Secondary	69	21	16	32	43,412	26,842	16,570	1,371	918	453
	Hi. Secondary	13	2	5	6	17,908	10,681	7,227	401	212	189
	GRAND TOTAL	1,275	234	184	857	186,239	112,273	73,966	4,569	3,237	1,332

by urban and rural 2018-19

Table 6 Sindh Education Data 2018-2019 (Government of Sindh, 2022)

2.1.2 Healthcare:

The healthcare infrastructure in Sukkur is also characterized by a clear urban-rural divide. Sukkur city has a number of hospitals, clinics, and private healthcare providers, offering relatively good access to medical services for urban residents. These facilities provide a range of services, from general medical care to specialized treatments. However, even in the city, public healthcare services often suffer from overcrowding, insufficient staffing, and a lack of essential medicines and equipment, leading many people to seek care from private providers, which can be costly.

In rural areas, healthcare access is much more constrained. Basic health units and rural health centers are often the only available medical facilities, and these are frequently understaffed and ill-equipped to handle anything beyond basic healthcare needs. The scarcity of healthcare professionals in rural areas is a significant issue, with many communities lacking access to qualified doctors, nurses, and midwives. This situation leads to high rates of maternal and child mortality, as well as the spread of preventable diseases. Additionally, traditional healers and unlicensed practitioners often fill the gap left by the formal healthcare system, which can lead to harmful practices.

Government, Departmental and Autonomous Bodies **HOSPITALS, with bed capacity**

GOVERNMENT												Autonomous		Other		TOTAL	
TEACHIG		CIVIL MAJOR		SPECIALIZED		TALUK A		DHQ Hospital		Body							
NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS	NO.	BEDS
1	530	0	0	2	60	0	0	2	40	0	0	0	0	96	201	101	831

b. Dispensaries, MCHC and T. B. Clinics, with bed capacity

SECTOR	DISPENSARIES		M.C.H.C.		T.B. CLINICS	
	NO.	BEDS	NO.	BEDS	NO.	BEDS
Govt.	36	6	2	4	14	0
Semi Govt.	0	0	0	0	0	0
Local Bodies	0	0	0	0	0	0
Private/Missionary	0	0	0	0	0	0
TOTAL	36	6	2	4	14	0

* Government Dispensaries also included with District Council Dispensary (DCD), Mobile Dispensary (M.D)-

Table 7 Showing Government health facilities of Sukkur District, Bureau of statistics Government of Sindh (Sindh B. o., 2022)

c. Leprosy Clinics, Maternity Homes, Homeo Dispensaries, Trauma Emergency Centers, U.S.K, U.H.C. and U.H.U (Government)

LEPROSY CLINICS	MATERNITY HOMES	HOMOEOPATHIC DISPENSARY	TRAUMA CENTERS	UNANI SHIFA KHANA	URBAN HEALTH CENTERS	URBAN HEALTH UNITS
1	8	0	2	1	0	1

d. Medical, Nursing and Para-Medical Personnel

SECTOR	Physicians	Surgeons	Gynecologists	Pediatricians	Doctors/GMO	Dentists	Nurses	LHV	Midwives	Med. Tech.	Disp. / Dresser	Lab. Tech.	Lab. Asst.	X-Ray Tech.	O.T. Tech.	Dental Tech./Asst.
Govt.	0	3	3	0	179	5	36	81	88	12	61	8	10	9	17	13
Semi Govt.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. Bodies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Private/Miss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Total	0	3	3	0	179	5	36	81	88	12	61	8	10	9	17	13
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d. Medical, Nursing and Para-Medical Personnel

SECTOR	E.C.G- Tech/ Asstt.	O.T. Asstt.	X- Ray Asstt.	U- Sound Asstt.	Blood Bank	Leprosy Tech.	Endosco- pies	Hemodial- ysis	E.T.T Tech.	E.N.T Tech.	Anesthes- ia Tech.	C.S.DT ech.	I.C.U. Tech.	Cardiac Tech.	Patholo- gy Tech.	C.T. Scan Tech.
Govt.	16	12	4	7	3	0	0	0	0	0	0	0	0	0	0	0
Semi Govt.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. Bodies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Private/Miss	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	16	12	4	7	3	0	0	0	0	0	0	0	0	0	0	0

e. Basic Health Units and Rural Health Centres with Bed capacity

HEALTH UNIT/CENTRE	NO. OF UNITS	NO. OF BEDS
BHUs	26	52
RHCs	5	38
TOTAL	31	90

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Table 8 Showing Government health Leprosy Clinics, Maternity Homes, Homeo Dispensaries, Trauma Emergency Centers of Sukkur District, Bureau of statistics Government of Sindh (District Contingency plan District Government Sukkur 2024)

Medical facilities.

1. An emergency crisis management center Civil Hospital Sukkur.
2. Railway Hospital Sukkur.
3. Taluka Hospital of Rohri and Pano Akil. Recovery/Rehabilitation Centre.
4. Availability of ASVs.

DETAILS OF HOSPITAL AND PARAMEDICS OF DISTRICT SUKKUR

S.No	Name of Hospital	No. of Doctors	No. of Paramedics	Bedding Capacity	Ambulances & Mobile Units	Facilities (Dispensaries, Vaccines, Anti-Venom, Anti-rabies etc.)
1	Pakistan Railways Sukkur	03	13	46	----	No anti-venom or anti-rabies vaccines are available at Railways Hospital Sukkur & Rohri.
2	Pakistan Railways Rohri	01	04	04	----	
3	Under Administration of DHO & PPHI, Sukkur.	192	819	284	19	9688 Medicine / vaccines / supplies.
4	Ghulam Muhammad Mahar Medical College Hospital, Sukkur.	74	115	545 Beds & (20 Emergency Beds)		

Table 9 Showing Government health facilities of Sukkur given in District Contingency plan District Government Sukkur 2024 (Sukkur, 2024)

DETAILS OF PRIVATE HOSPITAL OF DISTRICT SUKKUR (Sukkur, 2024)

S. No.	Name of Private Hospital	Address	Contact No.
1	Hira Medical Center Sukkur.	Workshop Road Sukkur.	071-614555, 5614111, Fax No. 071-5612777
2	Sukkur Blood & Drugs Donating Society / SBDDS Sukkur.	Eidgah Road Sukkur.	071-5615922, 071-5615375
3	Pakistan Red Crescent Hospital/Society Branch Sukkur.	Opp: Masoom Shah Minara Sukkur.	071-5623841, 071-5626252, 071-5623837
4	Mohammadi Hospital, Sukkur.	Minara Road Sukkur.	071-5620999
5	Indus Medical Center, Sukkur.	Near Shalimar Phatak Sukkur.	0301-8310042
6	Mustafai Trust General Hospital, Sukkur.	Near D.C. Office Sukkur.	071-5615596, 071-5615598
7	Cure Center, Sukkur.	Miani Road Sukkur.	071-5623815, 071-5624324, 0300-3152203
8	Pooj Hindu Panchyat Chairtable Hospital, Sukkur.	Bunder Road Sukkur.	071-5616611
9	Bhatti Hospital & Maternity Home, Sukkur.	Jagirani Muhalla Barrage Road Sukkur.	071-5630310- 071-5633733
10	City Health Care Center Sukkur.	Dr Nisar Khan Road Near Civil Hosp: Suk:	071-5618276, 071-5618277
11	Al-Shifa Eye Trust Hospital, Sukkur.	Near High Court Sukkur.	
12	Sukkur CT & Infertility Center Sukkur	Workshop Road Sukkur.	071-5614747,
13	Al-Faisal Medical Center, Sukkur.	Military Road Sukkur.	071-5630595
14	Al-Khair General Hospital, Sukkur.	Airport Road Sukkur.	071-5631772, 0316-5031772
15	Bhatti Hospital & Maternity Home, Sukkur.	Airport Road Sukkur.	071-5612181- 071-5612177
16	Bismillah Medical Center, Sukkur.	Sukkur Bypass Near NICVD Hospital Sukkur	
17	Sindh Rangers Hospital Sukkur.	Bus Terminal Abad Sukkur	071-5806170
18	MCH Center, Salehpat.	Near Salehpat City	0333-7176748, 071-5615922, 071-5615375 Under the Control of Sukkur Blood Bank Sukkur
19	Sakhi Baba General Hospital & Maternity Home, Sukkur.	Bhellar Road Panoakil.	071-5690450, 071-5809865
20	Mehran Maternity Home, Pano Akil.	Near Pano Akil City	0310-361500
21	Christian Mission Hospital, Sukkur.	Mission Road Sukkur.	071-5625199, 071-5625524

Table 10 Showing Private health facilities of Sukkur given in District Contingency plan District Government Sukkur 2024

2.1.3 Water and Sanitation:

Access to clean drinking water and adequate sanitation facilities is a critical component of public health, yet many areas in Sukkur continue to struggle with these basic services. According to a report by the Pakistan Council of Research in Water Resources (PCRWR), approximately 30% of households in urban Sukkur have access to piped water, but frequent issues such as intermittent supply and aging infrastructure persist (PCRWR, 2020). The municipal water supply system is under strain, leading to water contamination due to inadequate treatment processes. As a result, a large portion of the population relies on groundwater sourced through private boreholes or water purchased from vendors, which can cost up to 100-150 PKR per liter a significant burden on low-income households (Sohail & Mitchell, 2019). In rural Sukkur, the situation is far more precarious. A UNICEF report highlights that only 45% of the rural population has access to safe drinking water, with many communities depending on unsafe sources such as rivers, canals, and open wells (UNICEF, 2021). These water sources are often contaminated with pathogens, posing severe health risks. Furthermore, the lack of proper sanitation facilities is a pressing issue in rural Sukkur, where over 30% of the population still practices open defecation (World Bank, 2020). This not only exacerbates environmental degradation but also increases the risk of waterborne diseases, particularly during the monsoon season, when flooding contaminates existing water sources. A study by WHO estimates that during flood events, the incidence of waterborne diseases, including cholera and diarrhea, can increase by 25-30% in affected regions (WHO, 2019).

2.1.4 Electricity:

Electricity is crucial for economic development and overall quality of life, but in Sukkur, particularly in rural areas, access remains highly inconsistent. While Sukkur city is connected to the national grid, a study by the Pakistan Energy Council found that urban households experience power outages for an average of 4-6 hours daily, particularly during peak summer months when demand for electricity is at its highest (Pakistan Energy Council, 2021). These frequent outages disrupt not only daily activities but also economic operations, affecting businesses and households alike. In rural areas, the challenges are even greater. Many villages have no access to electricity at all, and those connected to the grid experience outages that can last for 12-16 hours a day (Asian Development Bank, 2020). The lack of reliable electricity affects all aspects of rural life, from the inability to use electric pumps for irrigation to the lack of lighting in homes and schools. A report by the International Renewable Energy Agency (IRENA) notes that 60% of rural households in Sukkur use kerosene lamps for lighting, which are both expensive and hazardous (IRENA, 2021). Additionally, the absence of electricity limits access to modern communication technologies, further isolating rural communities from essential services.

2.1.5 Transport and Communication:

Transportation infrastructure in Sukkur is unevenly developed between the urban center and rural areas. Sukkur city has a reasonably well-maintained road network, with connections to the National Highway and access to public and private transportation. However, a 2019 report by the **Pakistan Bureau of Statistics** indicates that **20% of the city's roads are in poor condition**, particularly in the peripheral areas, where traffic congestion is also becoming an increasing problem due to rapid urbanization (Pakistan Bureau of Statistics, 2019).

In contrast, rural areas face significant transportation challenges. Many villages are connected to main roads via dirt tracks, which become impassable during the rainy season, cutting off communities from essential services such as markets, healthcare, and education. A report by the **Asian Development Bank** shows that **40% of rural roads in Sukkur are in poor or impassable condition** during the monsoon season (ADB, 2020). Public transport in these areas is almost non-existent, and most residents rely on motorcycles, bicycles, or animal-drawn carts, limiting mobility and economic opportunities. Communication services, such as mobile phone networks and internet access, are significantly more accessible in urban Sukkur, where **over 80% of the population has access to 4G mobile networks** (Pakistan Telecommunication Authority, 2021). However, rural areas lag behind, with network coverage often unreliable. According to the **Pakistan Telecommunication Authority**, only **35% of rural Sukkur** has consistent access to mobile networks, and less than **20% of households have internet access**, hampering communication and access to critical information (PTA, 2021).

3. Vulnerability Assessment

3.1 Vulnerable villages/town.

TALUKA VILLAGES ROHRI.

Ali Wahan, Khadri, Katcho Mando Dero, Pacco Mando Dero, Dalho and Jhangro.

PANO AKIL.

Sadhuja, Budh Kheraj, Shahpur, Katcho Shahpur, Katcho No.1, Ural, Katcho No.2, Khan Belo, Panhwari, Kadir Dino, Bindi Katcho Kadir Dino, Sunder Belo, Bahman, Hussain Bel, Pacco Bindi, Shah Belo and Bindi Tharechani.

SUKKUR & NEW SUKKUR.

Old Sukkur, Bindi dharejo, Saeedabad, Bagarji, Mai Ranjhan.

VULNERABLE POINTS OF TALUKA SALEHPAT.

- (1) Metho Mahar, (2) Sobo Mahar (3) Village Venjhko (4) Village Gagro (5) village Saba Bhatti, (6) Village Warro Bhambro (7) Village Januji (8) Village Tooriyoon (9) Village Duhalwaro (10) Village Old Januji (11) Village Shahbaz Dino (12) Village Soohanro.

IDENTIFICATION OF VULNERABLE POINTS I.E LOW LYING AREAS, ENCROACHMENTS, WEAK EMBANKMENTS ETC.

VULNERABLE POINTS/ BUNS AND EMBANKMENT.

S.No	POINTS	AREA
1	Length of bund on left bank river Indus start from 0/0 mile Ali Wahan to Gemro bund.	44 Miles
2	Sukkur Begari bund on right bank of River Indus star from 0/0 Miles Jiand Pir to Garang.	7 Miles

3	Inside the protected walls within the city limits.	2 Miles
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Table 11 District Contingency plan District Government Sukkur 2024 (Sukkur, 2024)

S.No	POINTS	REASONS
1	RD-O5 to 07 L/S Bunder wall	Sluice point
2	S.B Bund mile 0/0 to 4/6 (R/S Old Sukkur)	Single Line & Open to wave wash.
3	Baiji Bund L/S Mile 8/3+330 to 8/4+330	Weak Embankments.
4	R.N Bund (Mile 0/0 TP 0/3)	Threat of below out

Table 12 District Contingency plan District Government Sukkur 2024

3.2 History of Floods in Sukkur

Sukkur has a long history of floods, which have had significant impacts on the community, infrastructure, and local economy. This section provides an overview of major flood events in Sukkur, highlighting trends and patterns in flooding over the years.

Historical Flood Events:

Sukkur has experienced numerous flood events, with some of the most notable ones occurring in the following years:

- **1973 Flood:** The 1973 flood was one of the earliest recorded major floods in Sukkur, causing widespread damage. The Indus River's overflowing waters led to severe flooding, inundating agricultural lands and residential areas. The impact was profound, resulting in displacement and economic losses.
- **1988 Flood:** Another significant flood hit Sukkur in 1988. The floodwaters breached embankments, causing extensive damage to infrastructure, homes, and farmlands. The event underscored the need for improved flood defenses and management strategies.
- **2010 Super Flood:** The 2010 flood, often referred to as the "Super Flood," was one of the most devastating natural disasters in Pakistan's history. Unprecedented monsoon rains caused the Indus River to overflow, leading to massive flooding across Sindh, including Sukkur. The floodwaters submerged entire villages, displaced millions, and caused extensive damage to crops, livestock, and infrastructure. This event highlighted the extreme vulnerability of Sukkur to such catastrophic floods.
- **2012 and 2013 Floods:** Sukkur experienced consecutive floods in 2012 and 2013. While not as severe as the 2010 flood, these events still caused significant damage. The floods affected residential areas, agricultural lands, and infrastructure, reinforcing the need for ongoing vigilance and improved flood management measures.

Floods in Sukkur Post-2013:

After 2013, Sukkur continued to experience periodic flooding, albeit with varying severity:

- **2014 Flood:** The 2014 flood was relatively less severe but still caused notable disruptions. Heavy monsoon rains led to flooding in low-lying areas, affecting agricultural activities and causing displacement.
- **2015 Flood:** Another flood event in 2015 impacted Sukkur, with water levels rising due to heavy rains and increased flow in the Indus River. The flood caused damage to infrastructure and agricultural lands.
- **2020 Flood:** In 2020, Sukkur faced flooding once again due to heavy monsoon rains. The floodwaters affected several villages and agricultural areas, highlighting the ongoing challenges in managing flood risks.
- **2022 Flood:** The most recent significant flood event in Sukkur occurred in 2022, part of the larger flooding crisis that affected much of Sindh. This flood was characterized by unusually heavy monsoon rains, which led to widespread flooding across the province. Sukkur, being one of the key districts along the Indus River, experienced severe impacts. The floodwaters inundated vast areas, causing extensive damage to homes, infrastructure, and farmlands. The 2022 flood underscored the persistent vulnerability of Sukkur to extreme weather events and the need for enhanced flood management and preparedness strategies.

3.3 Social Vulnerability in Floods

3.3.1 Vulnerability of Women in Floods

In Sukkur, women are often the primary caretakers of children, the elderly, and household responsibilities. During floods, these roles become burdensome as women struggle to manage evacuation, care for dependents, and secure essential resources like food and water. The socio-cultural norms that restrict women's mobility and limit their access to information exacerbate these challenges, leaving them more exposed to the dangers of floods. In past flood events, such as those in 2010 and 2022, women in Sukkur faced increased risks of gender-based violence in overcrowded and insecure shelters, along with a lack of privacy and access to sanitary facilities, further heightening their vulnerability.

3.3.2 Vulnerability of Children in Floods

Children in Sukkur are particularly vulnerable during floods due to the disruption of education, increased health risks, and psychosocial trauma. Floods in 2010 and 2022 caused extensive damage to schools, which either closed temporarily or were used as emergency shelters. This disruption in education has long-term consequences, leading to increased dropout rates and child labor as families struggle to recover from economic losses. The trauma of displacement, loss of family members, and the chaotic environment of flood shelters also have profound effects on children's mental health, with many suffering from anxiety and depression as a result.

3.3.3 Vulnerability of the Elderly in Floods

The elderly population in Sukkur faces significant challenges during floods, including limited mobility, health risks, and social isolation. During the floods of 2010, many elderly individuals found it difficult to evacuate quickly, leading to higher mortality rates among this group. The disruption of healthcare services and the physical strain of displacement exacerbated existing health conditions, further increasing their vulnerability. Additionally, the breakdown of social networks due to displacement left many elderly people without the support they needed,

contributing to their overall vulnerability.

3.3.4 Vulnerability of Persons with Disabilities (PWD) in Floods

PWD in Sukkur face unique challenges during floods, including physical and communication barriers that limit their ability to evacuate and access essential services. The floods in 2010 and 2022 highlighted the lack of accessible infrastructure in Sukkur, with many PWD unable to reach emergency shelters or move freely within flood-affected areas. Communication barriers, such as the lack of accessible warning systems, left many PWD unaware of the impending danger, further increasing their risk. Social stigma and discrimination also played a role, as PWD were often overlooked in relief efforts, receiving less assistance than other community members.

3.3.5 Impact of Floods on Building Structures

The impact of floods on building structures in Sukkur is often catastrophic. The floods of 2010, for instance, caused widespread destruction across the district, with thousands of homes completely destroyed or severely damaged. Floodwaters not only inundate structures but also erode foundations, weaken walls, and wash away entire buildings in extreme cases. The economic cost of rebuilding and repairing these structures is substantial, placing a heavy burden on local communities and the government.

Moreover, the destruction of buildings leads to long-term displacement of residents, loss of property and assets, and disruption of economic activities. Schools, healthcare facilities, and businesses suffer damage, leading to a decline in essential services and economic output. The psychological impact on residents who lose their homes and livelihoods cannot be overstated, as many face prolonged periods of uncertainty and hardship following flood events.

3.3.6 Impact of Floods on Road Infrastructure

Road Erosion and Washouts: Floodwaters, especially during peak monsoons or Indus River overflows, erode road surfaces and embankments, particularly in low-lying areas or along riverbanks. The 2022 floods in Sindh demonstrated this vulnerability, with many roads in Sukkur becoming impassable due to severe erosion, resulting in extended isolation and increased repair costs.

Bridge Damage and Collapse: Bridges are crucial for connectivity in Sukkur but are highly susceptible to flood damage. Strong currents and debris can compromise bridge integrity, leading to partial or complete collapse. The 2010 floods saw several bridges in the region destroyed, isolating communities and disrupting access to essential services and markets.

Submersion and Waterlogging: Roads built at or near ground level in Sukkur are prone to submersion during floods. Prolonged waterlogging weakens road foundations, leading to dangerous conditions and costly repairs, exacerbating traffic congestion and delaying the movement of goods and people.

3.3.7 Vulnerability of Livelihood Agriculture

The vulnerability of agriculture in Sukkur to floods is a significant concern, as agriculture forms the backbone of the local economy and the livelihoods of a large portion of the population. The region's agricultural sector is highly sensitive to the impacts of flooding, which can devastate crops, soil quality, livestock, and infrastructure, leading to long-term economic challenges and food insecurity.

Impact on Crops and Farmlands

- **Crop Destruction:** Flooding in Sukkur often results in the complete destruction of standing crops. The Indus River's overflow and heavy monsoon rains lead to inundation of farmlands, drowning crops like rice, wheat, cotton, and vegetables. The floods of 2010 and 2022, for example, caused massive losses, with thousands of acres of cultivated land submerged under water. The silt and debris left behind by receding waters further damage the fields, making them unfit for immediate replanting.
- **Delayed Planting and Harvesting:** The timing of floods also disrupts the agricultural calendar, leading to delayed planting and harvesting cycles. This delay can result in missed planting windows for subsequent crops, thereby reducing the number of harvests in a year. In regions like Sukkur, where multiple cropping cycles are crucial for farmers' incomes, this disruption has a cascading effect on agricultural productivity and economic stability.

Soil Quality and Fertility

- **Soil Erosion and Degradation:** Floodwaters often erode the topsoil, which is rich in nutrients essential for crop growth. The loss of topsoil not only reduces soil fertility but also increases the risk of future floods due to the destabilization of riverbanks and fields. This degradation makes it challenging for farmers to restore soil health and productivity without significant investment in soil amendments and fertilizers.
- **Salinization:** Prolonged flooding can lead to the accumulation of salts in the soil, particularly in areas with poor drainage. Salinization renders the soil less fertile and, in severe cases, completely barren. Farmers in Sukkur, who rely on the Indus River for irrigation, are especially vulnerable to this issue, as the mixing of floodwaters with saline groundwater exacerbates the problem.

Livestock Losses

- **Mortality and Disease:** Floods pose a direct threat to livestock, which are vital to the livelihoods of many farming families in Sukkur. During floods, animals often drown or die from exposure to the elements. The 2022 floods, for instance, led to significant livestock losses, with thousands of animals perishing due to the lack of shelter and food. Additionally, the overcrowded and unsanitary conditions in temporary shelters increase the risk of disease outbreaks among surviving livestock.
- **Loss of Fodder and Grazing Land:** Floods also destroy grazing lands and fodder supplies, leading to food shortages for livestock. The scarcity of feed results in weakened animals, lower milk production, and, in some cases, forced culling due to the inability to sustain the herd. This loss not only affects immediate income from livestock but also has long-term impacts on herd recovery and future earnings.

Infrastructure Damage

- **Irrigation Systems:** The agricultural sector in Sukkur relies heavily on an extensive network of canals and irrigation channels. Floods often damage these infrastructures, cutting off the water supply necessary for crop cultivation. Repairing these systems is costly and time-consuming, leading to further delays in agricultural recovery.
- **Farm Equipment and Storage Facilities:** Floodwaters can also damage or destroy farm equipment, seed stocks, and storage facilities. The loss of machinery like tractors, pumps, and tools hampers the ability of farmers to resume cultivation after the floods recede. Similarly, the destruction of grain storage facilities results in post-harvest losses, reducing the availability of food and seed for the next planting season.

Economic Impact on Farmers

- **Income Loss:** The direct impact of crop failure, livestock losses, and infrastructure damage translates into significant income loss for farmers. In Sukkur, where agriculture is the primary source of income for many households, this loss leads to increased debt and poverty. Farmers often resort to selling off assets, including land and livestock, to cope with the financial burden, further eroding their long-term economic stability.
- **Food Insecurity:** The loss of agricultural production due to floods also contributes to food insecurity, both locally and nationally. Reduced crop yields and livestock production lead to higher food prices, making it difficult for flood-affected communities to afford basic necessities. This food insecurity can lead to malnutrition, particularly among vulnerable groups like children and the elderly.

Adaptation and Resilience Challenges

- **Lack of Diversification:** Many farmers in Sukkur rely on a narrow range of crops and livestock, making them particularly vulnerable to flood-related losses. The lack of crop and income diversification limits their ability to absorb shocks and recover from disasters.
- **Insufficient Access to Financial Resources:** Access to credit, insurance, and government support is often limited for small-scale farmers in Sukkur. Without financial resources, they struggle to invest in flood-resilient infrastructure, purchase inputs for replanting, or recover from losses. This lack of financial security perpetuates a cycle of vulnerability and poverty.

3.3.8 Vulnerability of Business and industries

The vulnerability of businesses and industries to floods in Sukkur is a significant concern, particularly given the region's reliance on these sectors for economic stability and growth. Floods can have devastating effects on businesses, leading to direct physical damage, disruption of operations, loss of inventory, and long-term economic consequences. Understanding these vulnerabilities is essential for developing effective strategies to mitigate risks and enhance the resilience of Sukkur's business and industrial sectors.

Impact on Different Types of Businesses

- **Small and Medium Enterprises (SMEs):** Small and medium-sized enterprises form the backbone of Sukkur's local economy, encompassing a wide range of industries, from retail and services to manufacturing and agriculture. These businesses are particularly vulnerable to floods due to limited resources and lack of access to comprehensive insurance coverage. Floodwaters can cause direct damage to business premises, equipment, and inventory, leading to significant financial losses. SMEs often lack the financial resilience to recover quickly from such events, which can result in prolonged closures or even permanent shutdowns.
- **Large-Scale Industries:** While large-scale industries may have more resources to manage the impacts of floods, they are not immune to the risks. Industries located in low-lying or flood-prone areas face substantial risks of property damage, disruption of production, and loss of critical infrastructure. Floods can inundate factories, warehouses, and distribution centers, leading to the loss of valuable inventory and machinery. The disruption of supply chains and transportation networks further exacerbates these challenges, delaying production and affecting the overall profitability of the industry.

Disruption of Supply Chains and Logistics

- **Interruption of Raw Material Supply:** Many industries in Sukkur rely on a steady supply of raw materials to maintain their production processes. Floods can disrupt these supply chains by damaging transportation routes, such as roads and railways, or by inundating supplier facilities. This disruption can lead to delays in production, increased costs, and the need to source materials from alternative, often more expensive, suppliers. The 2022 floods in Sindh highlighted the fragility of these supply chains, as many businesses struggled to maintain production levels due to the unavailability of essential raw materials.
- **Logistical Challenges:** The movement of finished goods from factories to markets is critical for maintaining business continuity and customer satisfaction. Floods that damage transportation infrastructure, such as roads and bridges, create logistical challenges that delay the delivery of products to markets. This disruption can lead to a loss of sales, missed contractual deadlines, and increased transportation costs as businesses are forced to find alternative routes or methods of delivery. The inability to move products efficiently can also result in a buildup of inventory, tying up capital and reducing cash flow.

Impact on the Workforce

- **Employee Displacement and Absenteeism:** Floods can have a direct impact on the workforce by displacing employees from their homes or making it difficult for them to travel to work. In a region like Sukkur, where public transportation and infrastructure may be severely affected by floods, this can lead to high rates of absenteeism. The absence of key personnel can disrupt business operations, reduce productivity, and delay recovery efforts. Additionally, employees who have lost their homes or are dealing with personal crises may be less focused and productive, further impacting the business.

- **Health and Safety Concerns:** The health and safety of employees are also at risk during floods. Contaminated water, lack of sanitation, and exposure to hazardous materials can lead to health issues that affect workers' ability to perform their duties. Businesses may face additional costs related to providing medical care, ensuring workplace safety, and managing the health impacts on their workforce. This can lead to reduced operational efficiency and increased absenteeism, further compounding the challenges faced by businesses during and after a flood event.

Financial and Economic Impacts

- **Loss of Revenue:** One of the most immediate impacts of floods on businesses is the loss of revenue due to the disruption of operations. Businesses that are forced to close temporarily due to flood damage or lack of access face significant financial losses. This loss of revenue can be particularly devastating for businesses that operate on thin profit margins, such as retail stores, restaurants, and small manufacturers. The longer the disruption lasts, the more difficult it becomes for these businesses to recover and return to normal operations.
- **Increased Operational Costs:** Floods can lead to increased operational costs for businesses, including the cost of repairs, replacement of damaged equipment, and cleanup efforts. Additionally, businesses may incur higher costs for sourcing raw materials, transportation, and insurance premiums in the aftermath of a flood. These increased costs can strain financial resources, particularly for small businesses, and may require them to take on additional debt or cut back on other expenses to survive.
- **Impact on Insurance Costs:** While insurance can provide some financial protection against flood-related losses, the cost of premiums may increase significantly after a major flood event. Businesses in flood-prone areas like Sukkur may find it difficult to obtain affordable insurance coverage, or they may face higher deductibles and exclusions that limit their ability to recover fully from a flood. The increased cost of insurance can be a significant burden, particularly for small businesses, and may discourage investment in flood-prone areas.

Long-Term Economic Consequences

- **Reduced Investment and Economic Growth:** The vulnerability of Sukkur's business and industrial sectors to floods can have long-term economic consequences. Investors may be hesitant to invest in a region that is prone to frequent and severe flooding, leading to reduced economic growth and job creation. The uncertainty and risk associated with flooding can also deter businesses from expanding or upgrading their facilities, limiting the potential for economic development in the region.
- **Impact on Local Communities:** The economic impact of floods on businesses extends beyond the immediate financial losses. The closure or downsizing of businesses can lead to job losses, reduced income for local communities, and a decrease in economic activity. This can have a ripple effect throughout the local economy, leading to higher levels of poverty and increased vulnerability to future disasters. The loss of businesses and industries also reduces the tax base for local governments, limiting their ability to invest in infrastructure and services that could mitigate the impact of future floods.

Strategies for Reducing Vulnerability

- **Improving Flood-Resilient Infrastructure:** To reduce the vulnerability of businesses and industries to floods, it is essential to invest in flood-resilient infrastructure. This includes constructing flood defenses, improving drainage systems, and elevating buildings in flood-prone areas. Businesses should also consider flood-proofing their facilities by installing barriers, raising critical equipment above flood levels, and using materials that are resistant to water damage.
- **Developing Business Continuity Plans:** Businesses should develop and implement comprehensive business continuity plans that outline the steps to be taken before, during, and after a flood event. These plans should include strategies for protecting assets, maintaining operations, and ensuring the safety of employees. By planning ahead, businesses can reduce the impact of floods and recover more quickly from disruptions.
- **Strengthening Insurance and Financial Resources:** Access to adequate insurance coverage is crucial for mitigating the financial impact of floods on businesses. Businesses should work with insurers to ensure they have the appropriate coverage and consider participating in government programs that provide financial assistance for flood-related losses. Additionally, businesses should build financial reserves that can be used to cover unexpected expenses and support recovery efforts in the aftermath of a flood.

3.3.9 Vulnerability Related to Health

Impact on Healthcare Infrastructure

Floods in Sukkur have a severe impact on healthcare infrastructure, often leading to the destruction or inundation of hospitals, clinics, and medical facilities. The damage to physical structures hampers the delivery of critical health services, leaving the population vulnerable to disease outbreaks, injuries, and other health emergencies. The disruption of electricity and clean water supply further compounds these challenges, making it difficult to maintain hygiene and provide adequate care.

Recommendations:

1. Implement flood-resistant designs and elevate healthcare facilities in flood-prone areas to prevent inundation and devastation.
2. Ensure that all healthcare facilities have emergency backup systems for electricity, water, and sanitation in place to ensure service delivery during flooding.
3. Establish mobile healthcare units to provide medical services in remote locations during floods.

Increased Risk of Waterborne Diseases

Flooding significantly increases the risk of waterborne diseases, such as cholera, typhoid, and diarrhea, due to the contamination of water sources with sewage and other pollutants. The lack of access to clean drinking water and proper sanitation facilities exacerbates these health risks, particularly for vulnerable groups such as children, the elderly, and those with pre-existing

health conditions. The overcrowding in temporary shelters during floods can also lead to the rapid spread of infectious diseases, including respiratory infections and skin diseases.

Recommendation:

1. Improve the water and sanitation infrastructure by establishing flood-resistant water filtration systems and supplying safe drinking water to vulnerable populations
2. Conduct hygiene awareness efforts in flood-affected communities to promote the use of clean water, appropriate sanitation, and handwashing in order to decrease disease spread.
3. Ensure the timely provision of water purification tablets and hygiene kits in flood-prone areas.

Challenges in Accessing Healthcare Services

During flood events, many areas in Sukkur become inaccessible due to submerged roads and damaged bridges, making it difficult for people to reach healthcare facilities. This inaccessibility is particularly challenging for individuals with chronic illnesses, pregnant women, and those requiring urgent medical attention. The disruption of transportation networks also hinders the delivery of medical supplies and the deployment of emergency medical teams, further limiting the ability to provide timely and effective healthcare.

Recommendations:

1. Build elevated, flood-resistant roadways and bridges to ensure uninterrupted access to healthcare facilities during floods.
2. Create a strong emergency medical transportation infrastructure, including boats and amphibious vehicles, to transfer patients and medical supplies during flood situations.
3. Create a disaster response plan that includes pre-positioning medical supplies in flood-prone locations for easy access during an emergency

Mental Health Impact

The psychological impact of floods on the affected population is often overlooked but is a significant concern. The loss of homes, livelihoods, and loved ones can lead to severe mental health issues, including anxiety, depression, and post-traumatic stress disorder (PTSD). The stress of living in temporary shelters, uncertainty about the future, and the disruption of daily life further contribute to mental health challenges. However, the availability of mental health services in flood-affected areas is often limited, leaving many individuals without the support they need to cope with the trauma.

Recommendations:

1. Set up mental health support services in flood-affected communities, such as mobile counselling units, to give psychological first aid and long-term care.
2. Teach healthcare personnel and community leaders how to identify and treat mental health concerns like anxiety, depression, and PTSD in flood-affected populations.

3. Create community-based mental health initiatives that provide peer support and coping skills to persons suffering from the psychological effects of flooding.

3.3.10 Vulnerability Related to Education

Damage to Educational Infrastructure

Floods in Sukkur cause extensive damage to educational infrastructure, including schools, colleges, and other educational institutions. The inundation of school buildings, loss of educational materials, and destruction of furniture and equipment severely disrupt the learning environment. The rehabilitation and repair of damaged schools are often delayed due to resource constraints, prolonging the disruption to education and impacting the overall quality of education in the region.

Recommendations:

1. Create flood-resistant designs for schools, such as elevating buildings and employing water-resistant materials, to reduce damage during flooding.
2. Create a rapid-response fund to assist with the urgent rehabilitation of damaged schools, allowing educational activities to restart as soon as feasible.
3. To prevent flood damage, place educational materials and equipment in secure storage areas ahead of time.

Disruption of Educational Services

During and after floods, schools in Sukkur are often closed for extended periods, leading to significant interruptions in the academic calendar. These closures result in the loss of valuable learning time, which can have long-term effects on students' academic performance and progress. The disruption is particularly detrimental to students preparing for exams, as they lose access to teachers, study materials, and a conducive learning environment. The closure of schools also increases the risk of children dropping out of school, particularly in families facing economic hardship due to the flood.

Recommendations:

1. Introduce flexible academic calendars in flood-prone locations to allow for school closures during emergencies and to ensure that pupils can make up missing learning time.
2. Create temporary learning environments outside of high-risk flood zones, or deploy mobile education units to give continuing learning opportunities during flooding.
3. Provide online learning platforms or radio-based education programs to students in locations where traditional schooling is disrupted.

Use of Schools as Temporary Shelters

In the aftermath of floods, schools are often used as temporary shelters for displaced families, further delaying the resumption of educational activities. While providing shelter is essential for protecting vulnerable populations, the conversion of schools into shelters means that classrooms, toilets, and other facilities are repurposed for emergency use, making it difficult to restore them to their original condition once the floodwaters recede.

Recommendations:

1. Identify alternate facilities or areas for emergency shelters to lessen dependency on schools during floods, thereby protecting educational infrastructure and minimizing disturbance.
2. Establish temporary shelters with designated facilities for displaced families, and ensure that schools can resume normal activities as soon as the floodwaters recede.

Impact on Students and Teachers

The displacement of families due to floods forces many students and teachers to leave their homes, disrupting their routine and causing stress and anxiety. The displacement can lead to difficulties in continuing education, as students may be relocated to areas where schools are either non-existent or far from their temporary shelters. Teachers also face challenges in reaching their schools or may be unable to teach due to personal losses and responsibilities related to the flood.

Recommendations:

1. Provide transport for students and teachers who have been affected by flooding, allowing them to attend school and finish their education.
2. Offer financial and emotional support to flood-affected teachers to aid in their personal and professional recovery, ensuring their return to the classroom.
3. Set up after-school programs or tutoring services to help pupils make up for lost learning time caused by school closures due to flooding.

4. Community Perceptions on vulnerability and Challenges in Sukkur District

4.1 Lack of Support from Authorities

- Most of the participants highlighted the lack of timely and adequate support from district authorities during flood events. Despite repeated calls for help, the district government's response is often delayed, forcing communities to rely on external entities like the NGO's for immediate rescue and food distribution. This reliance reflects a systemic gap in local governance, where the authorities are either under-resourced or lack the urgency needed in disaster situations.

- The lack of formal training within organizations exacerbates this issue, as they depend on personal commitment rather than structured disaster response protocols.

4.2 Shelter and Housing Vulnerability

- Interviews consistently pointed to inadequate shelter provisions during floods. Families receive insufficient tents, leaving many without adequate protection from the elements. Homes destroyed during the floods are not reconstructed promptly, leading to long-term displacement and further exacerbating the community's vulnerability.
- The slow pace of reconstruction efforts, coupled with the absence of long-term housing solutions, forces many to live in temporary, unsafe conditions for extended periods.

4.3 Food Security

- The devastation of agricultural lands by floods directly impacts food security in the region. With stored food supplies washed away and crops destroyed, communities face severe food scarcity. Given that the livelihoods of most residents are tied to agriculture, the loss of crops not only creates immediate food shortages but also disrupts future planting seasons, leading to a cycle of food insecurity.
- Community representatives said that food is closely linked with the vulnerability of livestock, as the loss of fodder further impacts food production and economic stability.

4.4 Livestock and Fodder Crisis

- Livestock is a critical asset for these communities, providing both food and income. However, the floods result in a significant loss of fodder, leading to malnutrition and death among animals. This not only affects the immediate food supply but also diminishes the community's economic resilience. Interviewees emphasized the need for urgent interventions to protect livestock during floods, such as providing emergency fodder supplies and veterinary services.

4.5 Insufficient Flood Control Measures

- The lack of proactive flood control measures by district authorities was a recurring concern in all interviews. Communities often find themselves unprepared for floods due to inadequate infrastructure and poor maintenance of flood protection systems. The reactive rather than proactive approach of local authorities leaves communities vulnerable, with sporadic and insufficient support provided during crises.
- There is a pressing need for the implementation of systematic and well-planned flood control strategies that involve regular maintenance and community engagement.

4.6 Lack of Awareness and Orientation

- A significant gap identified in the interviews is the communities' lack of awareness regarding local government policies on flood management. The interviewees pointed out that most community members are unaware of any existing disaster management plans, and there is little to no orientation provided to them by the authorities.

- This lack of awareness severely hampers the effectiveness of any flood management efforts, as communities are left unprepared and uninformed about the resources and support that may be available to them.

4.7 Increase in Waterborne Diseases

- Post-flood conditions often lead to a surge in waterborne diseases such as malaria, diarrhea, and skin infections. Interviewees highlighted that the health response to these outbreaks is grossly inadequate, with limited medical services available during and after flood events. The absence of preventive measures and the slow response from health authorities exacerbate the situation, leading to widespread health crises.
- The communities require not only immediate medical aid but also long-term public health strategies to mitigate the impact of floods on health.

4.8 Neglect by Government

- Distrust in the government's ability to provide timely rescue and support was a common sentiment across all interviews. The communities feel neglected, with little confidence that the government will act effectively in times of crisis. As a result, they often turn to political figures or local leaders for assistance, bypassing official channels that they perceive as inefficient or corrupt.
- This theme underscores the need for rebuilding trust between the government and the community through consistent and reliable support during disasters.

4.9 Challenges in Evacuating Vulnerable Populations

- Vulnerable groups, particularly the elderly and persons with disabilities (PWDs), face severe challenges during evacuation efforts. Interviewees noted that there are insufficient resources, such as boats, to ensure their safe evacuation. This not only puts these individuals at higher risk but also places additional strain on families and community members who must assist them without adequate support.
- This theme highlights the need for targeted evacuation plans and resources that address the specific needs of vulnerable populations during floods.

4.10 Infrastructure and Shelter Vulnerabilities

- Poor road infrastructure is a significant barrier to effective emergency response during floods. Interviewees described how damaged roads hinder the movement of rescue teams and the delivery of essential services. Additionally, many homes are left unreconstructed after floods, further contributing to long-term displacement and shelter insecurity.
- The lack of infrastructure development and maintenance is a critical issue that needs addressing to improve community resilience.

4.11 Agricultural Vulnerability

- Repeated crop losses due to flooding have a devastating impact on the financial stability of farming communities. With each flood event, farmers incur more debt, making it increasingly difficult to recover and sustain their livelihoods. Interviewees stressed the

importance of providing agricultural support, such as crop insurance, improved irrigation systems, and financial assistance, to help communities rebuild after floods.

- This theme is closely tied to the broader economic vulnerabilities of the region, where agriculture is the primary source of income.

4.12 Road Damage

- Both kacha (unpaved) and paka (paved) roads are frequently damaged during floods, severely disrupting mobility and access to essential services. The interviews revealed that road damage is not just an immediate inconvenience but also a long-term problem that delays recovery efforts and hampers economic activities.
- Repairing and upgrading road infrastructure is critical to improving the overall resilience of communities to flood impacts.

4.13 Impact on Agriculture-Based Businesses

- Flooding has a profound impact on agriculture-based businesses, which are the economic backbone of the region. The destruction of crops and the illness or death of livestock result in significant financial losses for farmers and associated businesses. Interviewees emphasized that without external support, many of these businesses are unable to recover, leading to long-term economic instability in the region.
- Support for these businesses, including financial aid, technical assistance, and market access, is essential for economic recovery.

4.14 Flood Impact on Education

- Schools in flood-prone areas are often used as relief camps, which disrupts education for children. This practice, while necessary in the short term, has long-term negative effects on the education system, as it delays the resumption of classes and affects the overall quality of education. Interviewees suggested that alternative camps should be established to avoid using schools, thus minimizing the disruption to education.
- The need for educational continuity, even during disasters, is a critical issue that requires innovative solutions.

4.15 Health Risks

- Floods lead to an increase in the prevalence of diseases, but the response from healthcare facilities is often insufficient. Interviewees highlighted the lack of adequate healthcare infrastructure and services during and after flood events, which exacerbates the health crisis in affected communities.
- Strengthening healthcare services and ensuring their availability during floods is crucial for protecting community health.

4.16 Food Scarcity

- The interviews underscored the significant gaps between the food needs of flood-affected communities and the aid provided. Food scarcity is a recurring issue during floods, with many families receiving insufficient aid to meet their basic needs. This

scarcity not only impacts immediate survival but also has long-term effects on health and economic stability.

- Improving the efficiency and reach of food distribution during disasters is a key area for intervention.

4.17 Lack of Initiatives

- The interviews revealed that there are minimal efforts by local organizations to enhance long-term community resilience. Most initiatives are focused on emergency aid rather than sustainable solutions. The lack of proactive resilience-building measures leaves communities vulnerable to repeated flood impacts.
- There is a clear need for a shift in focus towards resilience-building initiatives that include infrastructure development, capacity building, and disaster preparedness.

4.18 Need for Comprehensive Support

- Communities expressed a strong need for comprehensive support from both the government and NGOs. This includes essential resources like boats for evacuation, tents, food, and medical supplies. Additionally, there is a need for long-term support in rebuilding homes, restoring livelihoods, and improving infrastructure.
- The interviews highlighted the importance of coordinated efforts between the government and NGOs to provide holistic and sustained support to flood-affected communities.

5. Different Disaster Risks (PDMA, 2023)

5.1 Riverine Flood

Category	Details
UCs at Risk (12)	Ali Wahan, Arore, Baiji, Hingoro, Loung Bhatti, Nauraja, Nindapur, Panhwar, Sadhuja, Sangi, Tamachani, Saeedabad
UCs not at Risk (11)	Dhandhi, Junas, Kandhra, Lal Juryo Khan Shambani, Mubarakpur, Patni, Salehpat, Sangrar, Sultanpur, Tarai, Trimunh
General Description	- Borders: Ghotki, India, Kashmore, Shikarpur, Khairpur - Indus River on the northwest side, narrowest point at Sukkur - Riverine forests protected by embankments - Agricultural lands irrigated by the Indus River and Nara Canal - Barren eastern border due to lack of water - Population: 1,487,903 (2017 census), 51% urban - Prone to riverine floods - Floods in 2010, 2011, and 2012 caused damage - MHVRA 2022: Flood hazard intensity from "Low to Very High" - Flood risk from "Low to Extreme"
Recommendations and Preparedness	- Daily river discharge monitoring - Warnings for high river discharge - Inspection of vulnerable embankments

	- Ready flood-fighting equipment - Bund classification and mapping - Preparation of flood camps - Awareness campaigns for flood-resilient infrastructure - Satellite imagery studies for embankments - Contact management for alert dissemination - Training for community-based flood fighting - Digital flood level gauges and surveillance cameras along embankments
Response	- Mobilization of rescue services, NGOs, and volunteers - Evacuation to shelters - Distribution of relief supplies - Communicable disease precautions - Activation of mobile health and education services - Early recovery and restoration arrangements
Recovery & Rehabilitation	- Damage assessment - Post-flood repairs - Resettlement on a "build back better" basis - Restoration of communication and essential services

5.2 Earthquake (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk
General Description	- Earthquake: Sudden ground shaking caused by crustal movement - Typically lasts no more than a minute but can cause significant damage - Hazard and risk intensity in Sukkur district: "Low"
Recommendations and Preparedness	- Identification of weak buildings and structures - Enforcement of land use and building codes - DRR measures in public infrastructure projects - Establishment of search and rescue infrastructure - Earthquake safety awareness and drills - Availability of materials for temporary shelters - Alternative communication systems - Medical emergency plan for mass casualties
Response	- Information gathering on earthquake intensity and damages - Mobilization of community-based volunteers and trained personnel - Establishment of emergency shelters - Medical assistance for the injured - Evacuation from damaged buildings - Security measures in affected areas - Aerial/drone surveys of affected areas - Restoration of essential services
Recovery & Rehabilitation	- Detailed damage and needs assessment - Rehabilitation on a "build back better" basis

5.3 Heatwave (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk

General Description	- Heatwave: Atmospheric temperature causing physiological stress - Sukkur's hot desert climate with temperatures up to 50°C - High temperatures lead to heatstroke, skin burns, and sometimes death - Climate change increasing frequency and intensity of heatwaves - MHVRA 2022: Heatwave hazard intensity "High to Severe" - Heatwave risk "Low to High"
Recommendations and Preparedness	- Future strategies for tree plantation and ecosystem restoration - Monitoring and issuing hot weather advisories - Upgradation of public healthcare facilities - Heatstroke awareness campaigns - Arrangements for uninterrupted electricity and water supply
Response	- Mobilization of NGOs and volunteers for heatstroke camps - Distribution of fresh drinking water - Use of local radio for safety information - Activation of mobile medical teams - Special arrangements for power supply to hospitals and heatstroke centers - Public advised to avoid travel and exertion on hot days
Recovery & Rehabilitation	- Assessment for tree planting areas - Evaluation of healthcare facilities for equipment and resources - Improvement in awareness campaigns and precautionary measures

5.4 Drought (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk
General Description	- Drought: Extended period of deficient rainfall - Causes water shortages, affects agriculture and livestock, and can lead to food insecurity - MHVRA 2022: Drought hazard intensity "Moderate to High" - Drought risk "Low to High"
Recommendations and Preparedness	- Monitoring of rainfall and water levels - Development of drought-resistant crops - Water conservation awareness campaigns - Community training on drought management - Stockpiling of essential supplies - Strengthening of irrigation systems
Response	- Distribution of water and food supplies - Support for affected farmers and herders - Activation of mobile health units

	- Relocation to areas with adequate water supply - Coordination with NGOs and government agencies for relief distribution
Recovery & Rehabilitation	- Rehabilitation of affected agriculture - Support for livestock replenishment - Implementation of long-term water conservation projects - Restoration of livelihoods through agricultural assistance and skill training

5.5 Cold Wave (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk
General Description	- Cold Wave: Sudden drop in temperature leading to frost, crop damage, and health risks like hypothermia - Typically occurs in winter months, can be severe for vulnerable populations - MHVRA 2022: Cold Wave hazard intensity "Low to Moderate" - Cold Wave risk "Low to Moderate"
Recommendations and Preparedness	- Monitoring of weather forecasts - Public advisories on cold weather precautions - Stockpiling of warm clothing and blankets - Strengthening public health facilities for cold-related illnesses - Awareness campaigns on cold wave preparedness
Response	- Distribution of warm clothing and blankets - Activation of shelters for the homeless - Provision of heating in public facilities - Medical assistance for cold-related illnesses - Support for vulnerable populations including children, elderly, and the homeless
Recovery & Rehabilitation	- Restoration of damaged crops - Assessment of affected areas and vulnerable populations - Improvement of public health infrastructure to handle future cold waves

5.6 Locust Infestation (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk
General Description	- Locust Infestation: Swarms of locusts causing widespread damage to crops and vegetation - Can lead to food insecurity and economic losses for farmers - MHVRA 2022: Locust hazard intensity "Low to High" - Locust risk "Low to High"
Recommendations and Preparedness	- Monitoring and early warning systems for locust movements - Training for farmers on locust control measures

	- Stockpiling of pesticides and spraying equipment - Coordination with agricultural departments for rapid response
Response	- Deployment of locust control teams - Aerial and ground spraying of pesticides - Support for affected farmers - Coordination with local and national authorities for containment and relief
Recovery & Rehabilitation	- Assessment of crop damage and economic impact - Assistance for replanting and recovery of affected farms - Implementation of long-term pest management strategies

5.7 Monsoon Rains (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk
General Description	- Monsoon Rains: Heavy seasonal rainfall that can cause flash floods, landslides, and urban flooding - Significant risk in both rural and urban areas, especially in poorly drained regions - MHVRA 2022: Monsoon Rains hazard intensity "Moderate to High" - Monsoon Rains risk "Low to High"
Recommendations and Preparedness	- Regular cleaning and maintenance of drainage systems - Floodplain management and urban planning to prevent waterlogging - Pre-monsoon awareness campaigns and safety drills - Stockpiling of emergency supplies - Coordination with weather forecasting agencies for timely alerts
Response	- Mobilization of rescue and relief teams - Establishment of temporary shelters in flood-prone areas - Distribution of relief supplies such as food, water, and medical aid - Restoration of affected infrastructure - Coordination with local authorities for emergency response efforts
Recovery & Rehabilitation	- Post-monsoon assessment and restoration of damaged infrastructure - Support for affected communities in rebuilding efforts - Implementation of long-term flood management and water conservation projects - Enhancement of early warning systems and communication channels

5.8 Windstorms (PDMA, 2023)

Category	Details
UCs at Risk	All UCs are at risk

General Description	- Windstorms: Severe winds that can cause damage to infrastructure, agriculture, and pose a risk to life - Common during the monsoon season but can occur throughout the year - MHVRA 2022: Windstorm hazard intensity "Low to Moderate" - Windstorm risk "Low to Moderate"
Recommendations and Preparedness	- Strengthening of buildings and structures to withstand strong winds - Regular tree trimming to prevent damage from falling branches - Public advisories on windstorm safety - Pre-positioning of emergency response equipment - Community training on windstorm preparedness
Response	- Rapid assessment of damage and affected areas - Immediate clearance of roads and debris - Activation of emergency shelters for displaced persons - Provision of medical assistance for injuries - Coordination with local authorities for relief distribution and restoration of essential services
Recovery & Rehabilitation	- Rehabilitation of damaged infrastructure and homes - Support for agricultural recovery - Strengthening of early warning systems and community awareness campaigns

5.9 Industrial Hazards (PDMA, 2023)

Category	Details
UCs at Risk	UCs with proximity to industrial zones and facilities are at higher risk
General Description	- Industrial Hazards: Risks associated with industrial activities, including chemical spills, explosions, and fires - Significant in areas near factories, chemical plants, and storage facilities - MHVRA 2022: Industrial Hazards intensity "Low to High" - Industrial Hazards risk "Low to High"
Recommendations and Preparedness	- Regular inspection and maintenance of industrial facilities - Implementation of safety protocols and emergency response plans by industries - Community awareness on industrial hazards - Coordination between industries and local authorities for hazard management - Establishment of emergency shelters and medical response teams
Response	- Immediate containment and control of industrial accidents - Evacuation of affected populations - Provision of medical treatment for exposure to hazardous substances - Coordination with industrial operators for emergency

	response - Monitoring of air, water, and soil quality post-incident
Recovery & Rehabilitation	- Assessment of environmental and public health impacts - Cleanup and decontamination of affected areas - Support for affected communities and workers - Strengthening of industrial safety regulations and enforcement

5.10 Lightning (PDMA, 2023)

Category	Details
UCs at Risk	All UCs, especially rural areas and open fields where people and livestock are more exposed
General Description	- Lightning: High-voltage electric discharges during thunderstorms, particularly common during heavy rains and monsoon seasons - Risk to both human life and livestock - Can cause fires, structural damage, and fatalities - MHVRA 2022: Lightning hazard intensity "Moderate to High" - Lightning risk "Low to High"
Recommendations and Preparedness	- Installation of lightning rods and grounding systems on buildings and tall structures - Public awareness campaigns on lightning safety, especially for farmers and those working outdoors - Early warning systems for thunderstorms - Development of lightning-safe shelters in vulnerable areas
Response	- Immediate medical response for lightning strike victims - Rapid assessment of fire incidents caused by lightning - Coordination with emergency services to extinguish fires and manage affected areas - Provision of temporary shelters for displaced persons and livestock
Recovery & Rehabilitation	- Repair and rebuilding of structures damaged by lightning-induced fires - Compensation and support for families of victims - Strengthening of public infrastructure with lightning protection systems - Continuous monitoring and research to improve lightning prediction and safety measures

6. Disaster Management & Coping Mechanism

Flood management in Sukkur, a region prone to recurring floods, especially during the monsoon season, is an essential aspect of safeguarding lives, property, and livelihoods. Over the years, various infrastructures and resources have been developed and deployed to manage and mitigate the impacts of flooding in the district. However, the effectiveness of these measures is contingent on their adequacy, maintenance, and integration into broader disaster management strategies.

6.1 Flood Forecasting and Early Warning Systems:

Flood forecasting and early warning systems are critical components of flood management in Sukkur. These systems are designed to predict the likelihood of flooding and provide advance warning to communities, enabling them to take precautionary measures. The Pakistan Meteorological Department (PMD), in collaboration with other agencies, monitors weather patterns, river levels, and rainfall data to forecast potential flood events.

The early warning system relies on a network of weather stations, river gauges, and satellite data to monitor the conditions that could lead to flooding. When a potential flood is detected, warnings are issued through various channels, including radio, television, social media, and direct communication with local authorities. These warnings are crucial for initiating evacuation plans, mobilizing resources, and implementing other flood response measures.

While the early warning system has improved over the years, challenges remain in ensuring that the warnings reach all affected communities in a timely and effective manner. In rural areas, where communication infrastructure is less developed, disseminating warnings can be more difficult. Additionally, the accuracy of flood forecasts is sometimes limited by the complexity of weather patterns and the dynamic nature of river systems.

6.2 Disaster Management Agencies and Response Teams:

Several governmental and non-governmental agencies are involved in flood management and disaster response in Sukkur. The National Disaster Management Authority (NDMA) and the Provincial Disaster Management Authority (PDMA) Sindh are the primary agencies responsible for coordinating flood response efforts. They work in conjunction with local authorities, including district administration and municipal bodies, to implement flood management strategies.

These agencies are tasked with preparing for, responding to, and recovering from flood events. They are involved in the development of flood management plans, conducting drills and training for emergency response teams, and coordinating relief efforts during and after floods. The PDMA, for instance, plays a key role in mobilizing resources, such as boats, tents, food supplies, and medical assistance, to support affected communities.

In addition to governmental agencies, various non-governmental organizations (NGOs) and community-based organizations (CBOs) are active in flood management in Sukkur. These organizations often work at the grassroots level, providing support to vulnerable communities, conducting awareness campaigns, and assisting in the implementation of flood preparedness measures.

6.3 Community-Based Initiatives and Traditional Coping Mechanisms:

Communities in Sukkur have developed their own coping mechanisms and strategies to deal with recurrent floods. These traditional practices include constructing elevated homes, stockpiling food and water, and using boats for transportation during floods. Community members often play a critical role in early warning dissemination and in organizing local response efforts, such as evacuating vulnerable populations and protecting livestock.

In recent years, Government and Non-Government organizations emphasis on involving communities in formal flood management planning and decision-making processes. Community-based disaster risk reduction (CBDRR) activities have been introduced to build local capacity for flood preparedness and response. These activities aim to empower communities to assess their own vulnerabilities, develop action plans, and collaborate with government agencies to enhance flood resilience.

6.4 Policy and Institutional Framework for Flood Risk Management

Flood risk management in Sukkur, like in other regions of Pakistan, is governed by a complex interplay of policies, institutional frameworks, and governance structures at the national, provincial, and district levels. These frameworks are designed to mitigate flood risks, prepare communities, and respond to flood events with the aim of minimizing loss of life, property damage, and economic disruption. The effectiveness of these frameworks, however, depends on how well they are implemented and coordinated among the various stakeholders involved.

6.5 National Flood Protection Plan (NFPP):

The National Flood Protection Plan (NFPP) serves as the primary policy document guiding flood risk management across Pakistan. The plan is periodically updated and outlines the strategies, structural measures, and non-structural measures necessary to reduce the vulnerability of flood-prone areas. The NFPP includes the construction and maintenance of flood protection infrastructure, such as embankments, levees, and drainage systems, as well as the development of early warning systems and public awareness campaigns.

The NFPP also emphasizes the need for integrated flood management, which includes the management of water resources, land use planning, and disaster preparedness. The plan is implemented through a collaborative approach involving federal, provincial, and district authorities, with specific roles and responsibilities assigned to each level of government.

6.6 Provincial Disaster Management Authority (PDMA) Sindh:

The Provincial Disaster Management Authority (PDMA) Sindh plays a central role in flood risk management in Sukkur. Established under the National Disaster Management Ordinance of 2006, the PDMA is responsible for implementing disaster risk reduction (DRR) strategies, coordinating disaster response efforts, and facilitating recovery and rehabilitation activities in the aftermath of disasters.

The PDMA Sindh works closely with the National Disaster Management Authority (NDMA) and other provincial departments to ensure that flood management policies are effectively implemented. The PDMA's responsibilities include:

- Developing and updating the Provincial Disaster Management Plan, which includes specific provisions for flood risk management.
- Coordinating with district authorities, including the District Disaster Management Authorities (DDMAs), to implement flood preparedness and response measures.
- Mobilizing resources, such as relief supplies and emergency response teams, during flood events.
- Conducting training and capacity-building programs for local officials, emergency responders, and communities.

In Sukkur, the PDMA Sindh has been instrumental in coordinating flood response efforts during major flood events. It works in collaboration with local authorities to disseminate early warnings, organize evacuations, and provide relief to affected communities.

6.7 District Disaster Management Authority (DDMA) Sukkur:

The District Disaster Management Authority (DDMA) Sukkur is the primary government authority responsible for managing flood risks at the district level. The DDMA operates under the guidance of the PDMA Sindh and is tasked with developing and implementing district-specific disaster management plans, which include flood risk management strategies.

6.8 National Disaster Risk Reduction Policy (NDRRP):

The National Disaster Risk Reduction Policy (NDRRP) provides a comprehensive framework for reducing disaster risks, including those posed by floods. The policy emphasizes the importance of integrating disaster risk reduction (DRR) into development planning at all levels of government, from the federal to the district level. It also promotes the use of climate-resilient infrastructure, community-based disaster risk management (CBDRM), and the inclusion of vulnerable groups in disaster management planning.

In the context of Sukkur, the NDRRP supports the development of policies and programs that enhance the resilience of communities to flood risks. It encourages the use of sustainable land use planning, the protection of natural floodplains, and the restoration of ecosystems that provide natural flood defenses, such as wetlands and mangroves.

The NDRRP also advocates for the integration of DRR into the education system, ensuring that communities are aware of the risks they face and are equipped with the knowledge and skills to respond effectively to flood events.

Given the importance of disaster management at all levels, it is recommended to establish various disaster management committees, including the District Disaster Management Authority (DDMA), Taluka Disaster Management Committee (TDMC), and Union Council Disaster Management Committee (UCDMC). The composition of these committees is detailed in Tables 1 to 4.

Responsibilities and Functions of District Disaster Management Authority (DDMA)

Sr.#	Responsibilities and Functions
1	Coordinate among all government agencies and non-government organizations operating in the district.
2	Act as the focal authority for disaster management plan implementation.
3	Ensure disaster management measures align with guidelines from PDMA or NDMA.
4	Provide leadership to achieve MHVRA Informed Disaster Management Plan goals.
5	Coordinate with PDMA Sindh on disaster preparedness, response, and recovery.
6	Support and guide district response plans, including managing the District Emergency Operation Centre (DEOC).
7	Review and align district disaster management plans with provincial and national policies.
8	Ensure risk maps are updated, and disaster-prone areas are prioritized.
9	Facilitate community training and awareness programs.
10	Set up and maintain early warning systems for disaster preparedness.
11	Review development plans for integration with disaster management strategies.
12	Coordinate with local authorities for effective disaster management.
13	Prepare and update district response and contingency plans.
14	Identify and prepare relief centers in case of disasters.
15	Ensure operational readiness of the DEOC.
16	Conduct rapid damage and needs assessments post-disaster.
17	Coordinate early recovery and rehabilitation efforts.
18	Maintain databases on external agency projects, resources, and areas of operation.
19	Perform additional functions as required by the provincial government for disaster management in the district.

Responsibilities and Functions of Union Council Disaster Management Committee (UCDMC)

Sr.#	Responsibilities and Functions
1	Serve as the front-line, first responder body at the village, mohalla, and ward level.
2	Assist TDMC, DDMA, and PDMA in disaster response.
3	Encourage and maintain a record of volunteers in the Union Council.
4	Formulate and manage groups for disaster and emergency response, such as evacuation and camp management groups.
5	Prepare awareness and capacity development proposals and follow up with TDMC, DDMA, and PDMA for grassroots training.
6	Identify and update all hazards in the respective locations and conduct risk and vulnerability analysis.
7	Prepare or update the UC level disaster management plan for emergent or new hazards.
8	Analyze disaster risk and list vulnerable villages and areas within the Union Council.
9	Mobilize the community for public maintenance and development activities.
10	Coordinate with neighboring UCs to gather and report quick information on disaster severity and impact.
11	Report cases of handicapped, destitute, and socially excluded groups to TDMC, DDMA, and PDMA for special needs in relief.
12	Mobilize and coordinate volunteer work and ensure community participation.
13	Conduct search and rescue operations in coordination with rescue teams and the Police.
14	Assist other agencies with the transport of staff, rescue parties, relief personnel, and materials.

15	Communicate with TDMC, DDMA, or PDMA for additional required resources.
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Table 3: Responsibilities and Functions of Provincial Emergency Operation Center (PEOC)

Sr.#	Responsibilities and Functions
1	Serve as the coordinating node for planning, management, and operations of disaster management activities.
2	Manage inventory and distribute goods during disaster events.
3	Oversee assets and vehicles management and monitoring.
4	Monitor extreme weather conditions and disasters.
5	Issue early warnings related to disasters.
6	Manage and monitor the disposal of man and material resources during disaster events.
7	Coordinate with community-based associations, volunteers, NGOs, and other relevant institutions involved in disaster management.
8	Assess disaster risks and elements at risk, and disseminate information to concerned departments.
9	Coordinate evacuation, medical aid, search and rescue, and relief operations.
10	Prepare and collect damage assessment reports.
11	Coordinate with all management tiers for efficient disaster response.
12	Provide daily briefings on disaster events, search and rescue operations, damages, and recovery and rehabilitation efforts.
13	Host online meetings for disaster management coordination.
14	Collect damage data using imaging drones.

Table 4: Functions of District Emergency Operation Center (DEOC)

Sr.#	Functions
1	Receive information and instructions from PEOC regarding the implementation and execution of action plans.
2	Monitor the situation and ensure everything is ready and functional in the DEOC.
3	Disseminate early warnings issued by PEOC to stakeholders and communities.
4	Coordinate with PEOC, PDMA, concerned departments, and other stakeholders.
5	Monitor emergency operations and take efforts to prevent secondary hazards.
6	Conduct rapid assessments of relief needs by collecting information from affected areas and circulating it to PDMA and other concerned departments.
7	Deploy evacuation, medical, search, and rescue teams in the affected areas.
8	Provide relief assistance in terms of relief camps, medical and sanitation facilities, and temporary shelter to the affected population in the district.
9	Establish liaison with concerned departments and stakeholders engaged in emergency response by anticipating resource inventory.
10	Collect information for daily briefings on disaster situations for PEOC, media, the general public, and other stakeholders.
11	Maintain record-keeping and prepare consolidated reports, response plans, and projects.
12	Coordinate and mobilize community-based associations, volunteers, NGOs, and other relevant institutions involved in disaster management.
13	Receive information and instructions from PEOC regarding the implementation and execution of action plans.
14	Monitor the situation and ensure everything is ready and functional in the DEOC.
15	Disseminate early warnings issued by PEOC to stakeholders and communities.

1. CONTACT DETAILS OF DEOC AND ITS FOCAL PERSON.
(Sukkur, 2024)

S.No	NAME OF OFFICER	DESIGNATION	DEPT:	FOCAL PERSON MEMBER
1	Ms. Bushra Mansoor	Addl: DC-II Sukkur	Revenue	0333-7122763
2	Ms. Sobia Falak Rao	Assistant Commissioner Sukkur City	Revenue	0316-0492816
3	Mr. Waseem Mahar	Assistant Commissioner New Sukkur	Revenue	0333-7119314
4	Ms. Labiqa Akram	Assistant Commissioner Rohri	Revenue	0345-9025650
5	Mr. Majid Ali Mako	Assistant Commissioner Salehpat	Revenue	0333-3707835
6	Ms. Rida Zehra Talpur	Assistant Commissioner Pano Akil	Revenue	0308-3348875
7	Mr. Babar Mehmood Bullo	Mukhtiarkar City Sukkur	Revenue	0336-6804440
8	Mr. Qurban Ali Dayo	Assistant Mukhtiarkar New Sukkur	Revenue	0302-8310040
9	Mr. Zahid Ali Shah	Mukhtiarkar Rohri	Revenue	0300-3157026
10	Mr. Shah Nawaz Charan	Mukhtiarkar Pano Akil	Revenue	0300-9315861
11	Mr. Asif Ali Kalwar	Mukhtiarkar Salehpat	Revenue	0306-3192584
12	Mr. Mohammad Ali Shaikh	Municipal Commissioner	Local Govt.	0333-7115225
13	Mr. Qazi Ali Gulzar	Chief Municipal Officer Rohri	Local Govt.	0333-7103858
14	Mr. Sajjad Simair	Town Officer Town Committee Pano akil	Local Govt.	0332-2210622
15	Mr. Ghulam Ali Shah	Administrator, Town Committee Salehpat	Local Govt	0309-7102828
16	Mr. Sharaf Ali Shah	Town Officer Town Committee Kandhra	Local Govt	0333-7100666
17	Mr. Ghulam Muhammad Mahar	Town Officer Town Committee Bagarji	Local Govt	0315-8419918
18	Mr. Nauman Kalhoro	XEN Municipal Corporation Sukkur	Local Govt	0300-3122069
19	Mr. Ali Anwar Ruk	Director Local Govt	Local Govt	0300-2195897
20	Dr. Pervez Korai	Taluka hospital Rohri	Health	0331-8010304
21	Dr. Salahuddin Ujjan	Taluka Pano Akil	Health	0310-3588893
22	Mr. Abdul Majid Bullo	DEO (Primary) Sukkur	Education	03003130100
23	Mr. Muhammad Asif Rafique	TEO (M/P) Sukkur City	Education	0300-9316401
24	Ms. Farhana Tabasum.	TEO (F/P) Sukkur City	Education	0333-7124382
25	Mr. Nisar Ahmed Khoso.	TEO (M/P) New Sukkur	Education	0300-9318172

26	Mr. Nisar Ahmed Khoso	Additional Charge TEO (F/P) New Sukkur	Education	0300-9318172
27	Ms. Sajida Farooque.	TEO (M/P) Rohri	Education	03003135097
28	Syed Khadim Hussain Shah.	TEO (F/P) Rohri	Education	03337220919
29	Mr. Ali Hassan Chachar	TEO (M/P) Pano Akil	Education	03003122801
30	Ms. Shaista Sindhu.	TEO (F/P) Pano Akil	Education	03009318996
31	Mr. Attaullah Mahtam	TEO (M/P) Salehpat	Education	03013738471
32	Mr. Attaullah Mahtam	TEO (F/P) Salehpat	Education	03013738471
33	Mr. Sanaullah Memon	XEN Public Health Department	Public Health Department	0300-3102833
34	Mr. Abdul Majeed Memon.	XEN Education Works	Public Health Department	0301-3520842
35	Dr. Zulfiqar Ali Mughal	Senior Veterinary Officer	Livestock	0333-3086177

Table 13 CONTACT DETAILS OF DEOC AND ITS FOCAL PERSON

T.O.R.s.

1. To ensure municipal services particularly removal of garbage, sanitation and cleaning of storm water drains.
2. To Deep the de-watering pumps, sewerage pumping stations and fire engines of all defunct TMAs fully functional.
3. To prepare the inventory of all resources/machinery available in the Taluka.
4. To de-water the area under flood/rain.
5. To constitute 1 to 3 **DE-WATERING TEAMS** for each U.C
6. To ensure un-Interrupted supply of power at waste water disposal stations.

1.1. Role of Non-Governmental Organizations (NGOs) and Community-Based Organizations (CBOs):

Non-governmental organizations (NGOs) and community-based organizations (CBOs) play a significant role in flood risk management in Sukkur. These organizations often work at the grassroots level, providing support to vulnerable communities, conducting risk assessments, and implementing flood preparedness measures.

NGOs and CBOs are also involved in advocacy and policy development, working to ensure that the voices of affected communities are heard in the decision-making process. They collaborate with government agencies to implement community-based disaster risk reduction (CBDRR) programs, which focus on building local capacity for flood preparedness and response.

In Sukkur, NGOs and CBOs have been active in raising awareness about flood risks, promoting the adoption of resilient practices, and supporting recovery efforts in the aftermath of floods. Their involvement is crucial for ensuring that flood risk management strategies are inclusive

and responsive to the needs of all community members, including women, children, the elderly, and persons with disabilities.

7. THE LIST OF NATIONAL AND INTERNATIONAL NGOs WORKING IN THE DISTRICT ALONGWITH THEIR CONTACT DETAILS.
LIST OF NATIONAL NGOs. (Sukkur, 2024)

S.No.	Organization Name	Contact Detail	Provided Services
1	Sukkur Blood & Drugs Donating Society.	Dr. Muhammad Naeem 071-5615922	Health
2	Anjuman Shoukat-e-Islam	Haji Muhammad Aijaz 0315-3121947	Orphan
3	STEP Welfare Association	Miss. Shaista Khoso 0331-2481607	Women Welfare
4	Pakistan Association of the Blind	Sohail Ahmed 0334-2448859	Welfare of Blind
5	Mangi Welfare Association	Shahzad Mangi 0312-8375573	Women & Child
6	Sukkur Township Welfare Association	Nazeer Ahmed Kalhri 0314-7755586	Welfare for resident of Township Sukkur.
7	Idara-e-Fawaid-e-Aama Mustafai Hospital	Dr. Ibrahim Bhutto 0300-8315557	Health
8	Wealth Development Soc: Welf: Organization.	Riaz Ali Solangi 0310-5059555	Help of Poor Peoples
9	Alert Citizen Welfare Organization	Illahi Bux Bhatti 0300-9315833	Welfare poor peoples
10	Women Development Welfare Association	Ghazala Bano 0308-0750798	Education
11	Khidmat-e-Awami Welfare Association	Nazeer Ahmed Bhatti 0310-3652284	Education
12	Malik Falahi Jamat	Muhammad Javeed 0300-3132660	Peoples Welfare
13	New Metro Lions Eye Welfare Association	Masood Ahmed 0315-3612531	Health
14	Chohan Welfare Association	Muhammad Ali 0300-3116149	Health
15	Sanam Faqir Social Welfare Tanzeem	Sanam Faqir 0311-1960715	Welfare of She / P
16	Struggliens Pakistan Social Welfare Organization.	Murtaza Gooble 0341-1131110	Education
17	Hallar Memon Jamat	Mohammad Hanif 0300-9315657	Education & Health
18	APWA	Mrs Hajib Khoso 0300-2956776	Education
19	Sukkur Memon Anjuman	Haji Muhammad Aziz 0300-9315657	Bus Service & Kafan
20	Help Hope Welfare Association	Agha Sagheer 0321-3115300	Help of poor peoples
21	Qutib Ali Shah Social Welfare Association	Ghulam Hyder Soomro 0321-3115300	Education
22	Shaikh Community Welfare Association	Bhai Khan 0300-2155039	Help poor persons
23	Health Welfare Committee	M Shafi Abbassi 0300-9311789	Health Welfare
24	Protection Human Rights Organization	Mrs Amuat-ul-Aziz 0333-7397523	Women Welfare
25	Protection of Rights Citizen Welfare Association	Irshad Ahmed Ghanghro 0301-3429629	Protection of Citizen

26	The Change Social Welfare Association	Ms. Azra Jamal 0315-3553666	Women Welfare
27	Malik Graduate League	Mr. Sagheer Ahmed 0314-3020877	Health & Education
28	AB Social Welfare Association	Saba Bhatti 0311-6718468	Education
29	Forest Workers Welfare Association	Mehmood Ghumro 0344-3850884	Employee Welfare
30	Insaf Social Welfare Association	Dr. Rabnawaz Kalwar 0300-3138944	Health
31	Rajput Khidmat Committee Association	Hafiz M. Ahmed 0314-9310343	Health Welfare
32	Hope Development Organization	Shabana Abdul Jabbar 0336-3601810	Women Inpowerm
33	Sukkur Tharadi Gujrati Memon Jamait	Haji Muhammad Hassan	Education
34	Rajput Bandhani Welfare Association	M. Sharif Bandhani 0300-8311341	Education
35	Jamiat-ul-Ansar Welfare Association	Arshad Mohammad 0345-3880415	Dani Maddrasa
36	Raju Marwari Village Dev: Welfare Association	Suresh kumar 0313-3880614	Women Welfare
37	Sukkur Public Transport Society	Assistant Commissioner Sukkur City. 071-9310607	Transport Facility
38	Promotion & Civic Sence Association	Mr. Hassan Qazi 0333-7179960	Education
39	JMD Social Welfare Association	Mr. Amita Bachan 0300-3180682	Child Welfare
40	Shah Latif Social Welfare Association	Shakil Ahmed Memon 0300-3184810	Education
41	Disable Itihad Social Welfare Association	Shahnawaz 0321-3125408	Welfare D/Pers
42	Wellbeing Operative Social Welfare Association	Kumail Hyder Shah 0333-7166466	Education & Health
43	Marvi Welfare Association	Allah Wadhayo Korai 0300-3145048	Education
44	John Social Welfare Association	Mr. Imran Khan 0321-7202002	Health
45	Sant Asoodha Ram Welfare Society	Dr. Hari Lal Bhageja 0300-8314347	Health
46	Al-Muntazir Social Welfare Organization	S. Mukhtiar Hussain Riz 0300-3134471	Education
47	Gurdwara Guru Amar Das Sahib SWA	Mr. Pardeep Singh 0300- 3291902	Education
48	Afshan Welfare & Educational Association	Mr. M Yaseen Indhar 0321-3621236	Education
49	Bahar Social Welfare Association	Ms. Rehana Zamaan 0300-3298996	Education
50	Quaid-e-Awam Welfare Association	Abdullah Achrani 0300-3298187	Women Welfare
51	Sujag Health Educational and ADO	Mohammad Yousuf 0300-3188776	Education/ Agri
52	Khawab Social Welfare Association	Hameeda 0308-3634457	Women Welfare

53	Rainbow Social Welfare Association	Janki Bhai	Education
54	Patient Welfare Society Hospital	Medical Officer 0300-9315833	Patients Welfare
55	Pirbhat Social Welfare Association	Mir Khan 0304-9193941	Education
56	Patient Welfare Society	Medical Officer	Patients Welfare
57	Patients Welfare Society	Medical Officer 071-9310213	Patients Welfare
58	Progressive Social Welfare Association	Ikhlaque Ahmed 0300-3293697	Welfare F/P
59	Universal Troops Liberal SWO	Ahmed Ali 0333-7455559	Child Welfare
60	Rural Dev: & Transformation Initiatives	Zameer Hussain 0300-3982858	Education
61	Anjuman Sabeel Al-Abbas & Welfare	Syed Akram Hussain 0313-3322887	Welfare for poor
62	Women Development Forum	Ms. Rehana Zaman 0300-9310996	Education
63	Hope for All Social Development Organization	Ms. Rabia Mirza 0312-1343195	Women Empowerment & Education
64	Helping Hands For Human Being	Ali Hassan 0300-5595098	Welfare of People & Education
65	MD Soomro Welfare Organization	Nazeer Ahmed Soomro 0300-8318066	Health Service
66	Shade Welfare Association	Mr. Maiz Khan 0315-2205201	Child Protection, Health, Education.

Table 14 List of National NGOs.

LIST OF INTERNATIONAL NGOs.

S.No.	Organization Name	Contact Detail	Provided Services
1	EDHI Sukkur	Mr. Muhammad Urs 0345-2551283	• 10 Ambulance service. • Health Camps • Trained staff for face any Emergencies.
2	WWF	Mr. Fadha Hussain Mangi 0304-8745947	• Provide Boats • Mobilization
3	MAGNETS Sindh	Irshad Mahar Cell No.0300-3181146	• Health Camps. • Camp Management • Camp Education • Advocacy
4	Insaf Social Welfare Association (ISWA)	Mr Rabnawaz Kalwar	• HR • Camp Management • NFI
5	SRSO	Ms. Nasreen Noonari 0333-7116862	• Ware House • HR • NFI
6	VNG	Mr. Saleem Shaikh	• HR
7	RDO	Ms. Saira Sahar 0334-2833395	• HR & Space Schools • Medical Facilities
8	Sukkur Blood Bank & Hospital	Mr. Abdul Jabbar	• Health Services complete

9	PEHEL Pakistan	Mr. Dedar Mirani	• Advocacy • Mobilization
10	SAHIL	Mr. Barkat Ali Ansari 0300-3100064 Email: ucsuk@sahil.org	• Socio physic support • Child Friendly space
11	HANDS	Mr. Zahid Khaskheli 0346-8209596	• Health Facility • Ambulances services
12	Nari Foundation Sukkur	Mr. Anwar Ali Mahar 0313-3467774	• Advocacy • HR
13	The Change Welfare Association, Sukkur.	Mrs. Azra Jamil 0333-2959475	• Established Free Medical Camps • Provide Medical Facilities/ Medicines.
14	River Development Organization (TRUST), Sukkur.	Rev. Munawar Gill 0321-3887010	• Protected place as a school building for shelter war house. • Trained staff by IOM for emergency.
15	Protection & Human Rights Organization, Sukkur	Ms. Samreen 0336-0398419	• Refresh course of Village Disaster Management Committee. • Refresh course of Hospital staff on disaster. • Refresh course of Schools around Disaster. • Refresh course of Disaster Management around Disaster preparedness plan.
16	Goth Seengar Foundation	Javed Ali 0300-3187606	• WASH, Education, Democracy
17	Strengthening Participatory Organization	Amjad Baloch 0300-4257509	• DRR, Climate Change, Women Empowerment, WASH, Education, Democracy
18	Community Development Foundation	Nasarullah Naich 0333-7341178	• DRR, Climate Change, Women Empowerment, WASH, Education, Democracy, Emergency Response
19	Action Against Hunger	Hussain Ali Awan 0333-1202078	• Nutrition • DRR • Health Services Integration • Food Security and Livelihood Support • Emergency Response
20	World Health Organization	Sohail Ahmed 0331-5957718	• Expended Program on Immunization
21.	Save the Children International	Naeem Khaskheli 0332-2736320	• WASH • Food Security and Livelihood • Child Protection • Education in Emergency • DDR and Emergency Response

Table 15 List of International NGOs.

1.2. Gaps, Needs, and Weak Points for Flood Management in Sukkur

Effective flood management in Sukkur faces several challenges, stemming from gaps in infrastructure, institutional coordination, resource allocation, and community engagement. Understanding these gaps, needs, and weak points is crucial for developing strategies that can better protect the region from the devastating impacts of floods. Below is a detailed discussion of the key issues:

1. Infrastructure Gaps:

- **Aging Infrastructure:** Much of the flood management infrastructure in Sukkur, including embankments, levees, and drainage systems, is outdated and poorly maintained. The Sukkur Barrage, which plays a critical role in flood control, requires regular maintenance and upgrades to ensure its continued effectiveness. However, financial and technical constraints often delay necessary repairs, leaving the region vulnerable to breaches and overflows during heavy rains and high river flows.
- **Inadequate Embankments:** The embankments along the Indus River, designed to protect the Kacha (riverine) areas, are often insufficient to withstand severe flood events. These embankments are prone to breaches, which can lead to catastrophic flooding in nearby communities. Additionally, the height and strength of these embankments need to be regularly assessed and reinforced to adapt to changing hydrological conditions.
- **Insufficient Drainage Systems:** The drainage infrastructure in Sukkur is inadequate to handle the heavy rainfall and waterlogging that accompany major flood events. Poorly designed or clogged drainage systems exacerbate flooding in urban areas, leading to water stagnation, which can cause further damage to property and increase the risk of waterborne diseases.
- **Limited Access to Early Warning Systems:** While early warning systems exist, their coverage and effectiveness are limited. Many communities, especially those in remote areas, do not receive timely warnings about impending floods. Additionally, the technology and communication infrastructure required to disseminate warnings quickly and effectively are often lacking or underdeveloped.

2. Institutional Weaknesses:

- **Lack of Coordination Among Agencies:** Flood management in Sukkur requires coordinated efforts among multiple government agencies, including the National Disaster Management Authority (NDMA), Provincial Disaster Management Authority (PDMA) Sindh, and the District Disaster Management Authority (DDMA) Sukkur. However, coordination among these agencies is often weak, leading to overlapping responsibilities, delays in decision-making, and inefficient use of resources.
- **Inadequate Implementation of Policies:** While there are comprehensive policies and plans in place for flood management, such as the National Flood Protection Plan (NFPP), their implementation at the ground level is often inconsistent. Bureaucratic hurdles, lack of accountability, and limited monitoring and evaluation mechanisms contribute to the poor execution of flood management strategies.
- **Resource Constraints:** The financial and human resources allocated to flood management in Sukkur are insufficient to meet the demands of effective disaster risk reduction (DRR). Budgetary constraints limit the ability of local authorities to invest in critical infrastructure, conduct regular maintenance, and deploy adequate personnel during flood events. Moreover, the capacity of local institutions to plan and respond to floods is hampered by a lack of trained staff and technical expertise.

3. Community Engagement and Awareness:

- **Low Public Awareness:** Public awareness about flood risks and preparedness measures is generally low, particularly in rural and vulnerable communities. Many residents are unaware of the early warning systems in place, the proper evacuation procedures, and the steps they can take to protect their homes and livelihoods during a flood. This lack of awareness increases the vulnerability of communities to flood impacts and hinders the effectiveness of response efforts.
- **Limited Community Participation:** Community involvement in flood management planning and decision-making is minimal. Local communities are often not consulted when flood management policies and infrastructure projects are developed, leading to solutions that do not fully address their needs or leverage their local knowledge. Moreover, the lack of community-based disaster risk reduction (CBDRR) initiatives means that local capacities to manage and respond to floods are underutilized.

4. Environmental Degradation:

- **Degradation of Natural Flood Defenses:** The natural flood defenses in Sukkur, such as wetlands, floodplains, and riverine forests, have been significantly degraded due to human activities, including deforestation, land reclamation, and unplanned urbanization. These ecosystems play a crucial role in absorbing excess water during floods and reducing the velocity of floodwaters. Their degradation increases the vulnerability of the region to severe flooding.
- **Unregulated Development in Flood-Prone Areas:** Unregulated construction and agricultural expansion in flood-prone areas, particularly in the Kacha regions, exacerbate the risk of flooding. The encroachment of human settlements into natural floodplains reduces the land's ability to absorb floodwaters and increases the exposure of populations to flood hazards. The absence of strict land-use planning and enforcement further aggravates this issue.

5. Data and Research Gaps:

- **Lack of Comprehensive Data:** Accurate and up-to-date data on flood patterns, hydrology, and climate change impacts are essential for effective flood management. However, there are significant gaps in the availability and accessibility of such data in Sukkur. The absence of detailed flood risk maps and vulnerability assessments hinders the ability of local authorities to plan for and respond to floods effectively.
- **Limited Research on Climate Change Impacts:** The impacts of climate change on flood patterns in Sukkur are not fully understood due to limited research and analysis. As climate change is expected to increase the frequency and intensity of extreme weather events, including floods, it is critical to conduct thorough research to inform adaptive strategies and policies. The lack of such research leaves the region ill-prepared to address future flood risks.

6. Emergency Response and Recovery:

- **Inadequate Emergency Response Capacity:** The emergency response capacity in Sukkur is insufficient to deal with large-scale flood events. Emergency services, including search and rescue teams, medical facilities, and relief distribution mechanisms, are often overwhelmed during floods. The lack of well-trained emergency personnel, equipment, and logistical support further limits the effectiveness of response efforts.
- **Challenges in Post-Flood Recovery:** Recovery and rehabilitation efforts following floods in Sukkur are often slow and poorly coordinated. Affected communities frequently face delays in receiving assistance to rebuild homes, restore livelihoods, and access basic services. The absence of a comprehensive recovery plan that includes provisions for long-term reconstruction, livelihood support, and psychological assistance exacerbates the long-term impacts of floods on vulnerable populations.

Community Coping Mechanism

To effectively address the recurring floods in Sukkur, it is recommended that the following community coping mechanisms be acknowledged and strengthened. These strategies, though rooted in tradition and social networks, require additional support and enhancement to meet the increasing challenges posed by climate change and more frequent flood events.

Traditional Knowledge and Practices

It is essential to recognize and integrate traditional knowledge and practices within flood management strategies. The community's understanding of seasonal patterns and natural indicators for predicting floods should be documented and combined with modern scientific approaches. It is suggested that training programs be developed to bridge the gap between traditional practices and contemporary flood prediction methods. This integration will ensure that communities can better anticipate and prepare for floods, enhancing their overall resilience.

Social Networks and Mutual Support

There is a strong need to support and reinforce the existing social networks and mutual support systems within Sukkur. These networks are vital in providing immediate assistance during floods. It is recommended that community-driven initiatives be formalized and supplemented with external resources. Additionally, establishing community emergency funds, backed by local or regional governments, could provide financial support during disasters, ensuring that social networks are not overstretched during large-scale flood events.

Diversification of Livelihoods

It is recommended that efforts be made to further diversify livelihoods within the community. The diversification of income sources is crucial for reducing vulnerability to floods. It is advised that programs be introduced to provide training in alternative income-generating activities, as well as access to microfinance options to support small businesses and farming activities. These efforts should focus on ensuring that livelihoods remain sustainable despite the increasing unpredictability of flood patterns.

Use of Indigenous Materials for Flood Protection

Communities in Sukkur are encouraged to continue utilizing indigenous materials for flood protection; however, it is suggested that these efforts be supported by technical guidance and financial assistance to enhance their effectiveness. Building more durable and permanent flood barriers with local resources could significantly reduce the impact of floodwaters on homes and agricultural land. External agencies should consider investing in the development of such infrastructure, while also training community members in improved construction techniques.

Informal Warning and Communication Systems

It is strongly recommended that informal warning and communication systems be enhanced and formalized to ensure that all community members are reached during flood events. There is a need for the establishment of a reliable early warning system that is accessible to everyone, including those in remote areas. Involving community leaders in the design and implementation of these systems will help ensure their effectiveness and acceptance. Additionally, investing in communication infrastructure, such as mobile alerts or community radios, could greatly improve the speed and reliability of warnings.

1.3. Flood Forecasting and Early Warning System (EWS)

Flood Forecasting and Early Warning System (EWS)

To effectively mitigate the impact of floods in Sukkur, it is strongly recommended that a comprehensive Flood Forecasting and Early Warning System (EWS) be established and maintained. The EWS is a critical component of flood risk management, enabling timely and accurate dissemination of information that can save lives, reduce damage, and enhance preparedness at all levels. The following detailed considerations outline the essential aspects that need to be addressed to optimize the EWS in Sukkur.

Integration of Modern Technology with Local Knowledge

It is advised that the EWS incorporate modern technology alongside traditional knowledge systems. This integration will enhance the accuracy of flood forecasting while ensuring that the local population can easily interpret and respond to warnings. The use of advanced meteorological tools, remote sensing, and hydrological modeling should be prioritized. Moreover, training programs should be developed to educate local communities on interpreting data and using it effectively in conjunction with their traditional practices.

Establishment of Real-Time Data Collection Systems

There is a need to establish real-time data collection systems throughout the Sukkur region. These systems should include automated weather stations, river gauge networks, and satellite-based observation tools that continuously monitor rainfall, river levels, and other relevant parameters. It is recommended that this data be centrally collected, analyzed, and disseminated in a timely manner. To ensure the reliability of the EWS, these systems should be regularly maintained and updated.

Development of a Multi-Tiered Warning Dissemination Network

It is suggested that a multi-tiered warning dissemination network be developed to ensure that early warnings reach all segments of the population, including those in remote or underserved areas. This network should include multiple channels such as SMS alerts, community radios, public announcement systems, and social media platforms. Local leaders, community organizations, and NGOs should be involved in disseminating warnings to ensure widespread reach and credibility. It is recommended that drills and simulations be conducted regularly to test the effectiveness of the dissemination process.

Community Involvement and Training

There is a strong need to involve local communities in the EWS to ensure its effectiveness and sustainability. Community members should be trained in understanding and responding to early warnings, with special focus on vulnerable groups such as women, children, the elderly, and persons with disabilities (PWD). It is recommended that community-based organizations (CBOs) be empowered to act as intermediaries in the EWS, facilitating communication between authorities and the public. This approach will help build trust in the system and ensure timely action during flood events.

Cross-Agency Coordination

It is crucial that the EWS be supported by strong cross-agency coordination. This involves collaboration between meteorological departments, disaster management authorities, local governments, and non-governmental organizations. It is recommended that a central coordinating body be established to oversee the EWS, ensuring that information flows smoothly between agencies and that there is a unified response during flood events. Regular inter-agency meetings and joint exercises should be conducted

to reinforce coordination and improve the system's overall efficiency.

Continuous Improvement and Adaptation

The EWS should be viewed as a dynamic system that requires continuous improvement and adaptation to new challenges. It is suggested that periodic reviews of the system be conducted to identify gaps, incorporate new technologies, and adjust to changing environmental conditions. Feedback from communities and stakeholders should be actively sought and used to refine the system. This ongoing process will ensure that the EWS remains relevant, effective, and capable of protecting the population from future flood risks.

2. Suggested Framework for DDMA

Recommended framework to be developed by the District Coordination Committee and the District Disaster Management Authority (DDMA) for a Flood Forecasting and Early Warning System (EWS) in Sukkur:

Objective	Activities	Outcomes	Responsible Departments/Organizations
1. Develop an Integrated Flood Forecasting and Early Warning System (EWS)	- Conduct a needs assessment to determine technical requirements for the EWS. - Install and maintain real-time data collection tools (e.g., weather stations, river gauges). - Integrate traditional knowledge with modern forecasting techniques.	A comprehensive, accurate, and reliable EWS is established, enabling timely flood predictions.	- District Disaster Management Authority (DDMA) - Pakistan Meteorological Department (PMD) - Local NGOs - Community-Based Organizations (CBOs)
2. Establish a Real-Time Data Collection and Analysis Network	- Set up automated weather stations and river gauge networks. - Link real-time data to a central analysis hub for continuous monitoring. - Train local personnel in data collection and interpretation.	- Real-time, accurate data collection supports precise flood forecasting and timely warnings.	- DDMA - Pakistan Meteorological Department (PMD) - Irrigation Department - Local Universities/Research Institutes
3. Develop a Multi-Tiered	- Create a communication	- Widespread and timely	- DDMA - Provincial Disaster

Warning Dissemination Network	plan that includes SMS alerts, community radios, and public announcements. - Conduct public awareness campaigns to inform about the EWS. - Implement regular drills and simulations for communities.	dissemination of flood warnings reaches all community members, reducing loss of life and property.	Management Authority (PDMA) - Local Media Outlets - Telecom Companies - NGOs/CBOs
4. Enhance Community Involvement and Training	- Organize workshops and training sessions for community members on interpreting and responding to early warnings. - Engage local leaders and CBOs to facilitate EWS implementation. - Establish community emergency response teams.	- Increased community readiness and capacity to respond effectively to flood warnings.	- DDMA - Local NGOs/CBOs - Civil Defense Organizations - Educational Institutions
5. Strengthen Cross-Agency Coordination	- Form a central coordinating body for the EWS within the DDMA. - Hold regular inter-agency meetings and joint training exercises. - Develop standard operating procedures (SOPs) for coordinated response.	- Improved collaboration among agencies leads to a unified and efficient flood response.	- DDMA - Provincial Disaster Management Authority (PDMA) - Pakistan Meteorological Department (PMD) - Law Enforcement Agencies
6. Continuously Improve and Adapt the EWS	- Conduct periodic reviews of the EWS performance and identify gaps. - Incorporate feedback from communities and stakeholders. - Integrate new technologies and	- An adaptive and resilient EWS that remains effective against evolving flood risks.	- DDMA - Local Universities/Research Institutes - NGOs/CBOs - Technical Experts and Consult

	adjust to changing flood patterns.		
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2.1. Role of Different Government Departments in Flood Forecasting and Early Warning System (EWS) for Sukkur

Department	Detailed Responsibilities	Level of Implementation
District Disaster Management Authority (DDMA)	- Leading and coordinating all disaster management activities at the district level. - Developing and implementing flood contingency plans. - Coordinating evacuation, relief, and recovery operations during flood events. - Managing the distribution of relief materials and resources. - Collaborating with provincial and national agencies for resource allocation and support.	District Level
Pakistan Meteorological Department (PMD)	- Monitoring weather patterns and issuing timely flood forecasts and early warnings. - Conducting meteorological research to improve flood prediction models. - Collaborating with international meteorological organizations for data exchange and support. - Disseminating early warnings to relevant authorities and the public through various communication channels.	National and Provincial Levels
Irrigation Department	- Managing and monitoring river levels, dams, and barrages to prevent and control flooding. - Maintaining and repairing flood control infrastructure, including levees, embankments, and canals. - Regulating water releases from reservoirs to minimize flood risks. - Coordinating with DDMA and PDMA on flood management strategies.	Provincial and District Levels
Provincial Disaster Management Authority (PDMA)	- Providing oversight and coordination of disaster management activities across the province. - Allocating resources and providing technical support to district authorities during flood events. - Developing provincial disaster	Provincial Level

	management policies and frameworks. - Organizing capacity-building programs for local disaster management personnel.	
Health Department	- Ensuring the availability of medical services and supplies during floods. - Managing disease control measures, including vaccination and sanitation campaigns. - Coordinating with hospitals and healthcare facilities for emergency response. - Providing psychological support and trauma counseling to affected populations.	National, Provincial, and District Levels
Local Government Department	- Managing municipal services, including drainage systems, waste management, and road maintenance. - Ensuring the rapid repair of critical infrastructure, such as bridges and roads, post-floods. - Coordinating with community leaders to implement local flood mitigation measures. - Overseeing the provision of temporary shelters for displaced populations.	Provincial and District Levels
Education Department	- Preparing educational institutions to serve as emergency shelters during floods. - Ensuring the continuity of education during and after flood events through alternative learning methods. - Training teachers and staff on disaster preparedness and response. - Raising awareness among students and communities about flood risks and safety measures.	Provincial and District Levels
Law Enforcement Agencies (Police and Rangers)	- Maintaining law and order during floods, preventing looting, and protecting property. - Assisting in the safe evacuation of vulnerable populations, including women, children, and the elderly. - Supporting search and rescue operations in flood-affected areas. - Enforcing curfews and other emergency measures as needed.	National, Provincial, and District Levels
Communication and	- Ensuring the functionality of	National, Provincial,

Information Technology Department	communication networks during flood events. - Disseminating early warnings and important information to the public and authorities. - Coordinating with media outlets to broadcast flood-related updates and safety instructions. - Developing and maintaining emergency communication platforms.	and District Levels
Social Welfare Department	- Providing support to vulnerable populations, including women, children, the elderly, and people with disabilities. - Mobilizing community volunteers for relief and rehabilitation efforts. - Coordinating the distribution of social assistance, including food, clothing, and shelter. - Implementing programs for the psychosocial recovery of affected communities.	Provincial and District Levels
SEPCO (Sukkur Electric Power Company)	- Managing the electricity supply during floods, ensuring power continuity in critical areas, such as hospitals and shelters. - Coordinating with emergency services to restore power in flood-affected areas. - Implementing safety measures to prevent electrical hazards during floods. - Communicating with the public about power outages and restoration efforts.	District Level
Public Health Engineering Department	- Ensuring the availability of clean drinking water during floods. - Maintaining sanitation services to prevent the outbreak of waterborne diseases. - Providing emergency water supply to flood-affected communities. - Coordinating with health authorities on public health campaigns related to water and sanitation.	Provincial and District Levels

2.2. Disaster Management at UC Level

Riverine Flood	
UCs at Risk (12)	Saeed Abad, Ali Wahan, Arore, Baiji, Hingoro, Loung Bhatti, Nauraja, Nindapur, Panhwar, Sadhuja, Sangi, Tamachani,
UCs not at Risk (12)	Dhandhi, Junas, Kandhra, Lal Juryo Khan Shambani, Mithree No. 33, Mubarakpur, Patni, Salehpat, Sangrar, Sultanpur, Tarai , Trimunh
General Description	1. This district is bounded by district Ghotki and India on the east, district Kashmore on the north, district Shikarpur on the north-west, and district Khairpur on the west and south. 2. Indus River flows on the north-western side of this district. Sukkur is the narrowest part of the Indus River course. 3. Sukkur has a large Riverine forest along the course of the Indus. These tropical forests are found within the protective embankments on either side of the Indus. 4. The areas of the district that are adjacent to the river and canal are irrigated and mainly consists of the croplands. 5. The north western parts of the district are irrigated through Indus River. Nara canal emanates from the Sukkur Barrage and irrigates the southern parts of the district. However, the rest of the district, on the eastern border, due to non-availability of water are barren. 6. The total population of district according to 2017 census was recorded to be 1,487,903.² Since district Sukkur is a partly urban district, where 51% of the population resides in urban areas, sources of livelihood are diversified for the resident population. While agriculture is the main source of employment for the rural population. 7. District Sukkur is vulnerable to riverine floods. 8. District Sukkur was hit by floods in 2010, 2011, and 2012. However, the severity of these floods was moderate in Sukkur as compared to other districts. 9. In 2010 floods, a total 130 villages were affected. A population of 247,913 persons was affected and there were 16 casualties.³ 10. Large parts of Sukkur district were inundated in 2010 and 2011 floods and was badly hit by heavy rains in 2012, which resulted in damage to the public health infrastructure in the district. 11. According to MHVRA study 2022, flood hazard intensity for district Sukkur is “Low to Very High” 12. According to MHVRA study 2022, flood risk for district Sukkur is “Low to Extreme”
Disaster Management Measures Preparedness	
	1. Recording of daily river discharge at barrages in Sindh, and regular dissemination among stakeholders. 2. In case of high discharge, dissemination of warnings and alerts to masses living in flood plain. 3. Identification and inspection of vulnerable embankments likely to be affected due to flooding during pre-monsoon season, as per “Bund Manual” of irrigation department.

	4. Inspection and readiness of flood fighting equipment available with district government departments prior to flooding season. 5. Classify and map bunds based on their origin (Mud, Brick, Stone, Concrete, Boulder, etc.) 6. Readiness of flood camps in high riverine flood and breaching risk areas. 7. Maintenance and strengthening of identified weak embankments. 8. Awareness and motivation campaigns on construction of flood resilient buildings and infrastructures. 9. Regular awareness campaigns on flood precautions and safe evacuations using various media platform. 10. Inclusion and implementation of Disaster Risk Reduction (DRR) measures in development projects at planning stage for building flood resilient infrastructure. 11. Conduct of satellite imagery based study for identification of vulnerable embankments before each monsoon and flooding period. 12. Collection and management of contact information of area/village influential for alert and warning dissemination. 13. Readiness of community-based volunteers and other related organizations / NGOs. 14. Regular community-based flood fighting trainings through government departments or any other appropriate platforms. 15. Installation of digital flood level gauges along embankments and dissemination of real-time flow level measurements to concerned authorities. 16. Installation of surveillance cameras at safe places for consistent monitoring of structural integrity of vulnerable embankments.
Response	
	1. Mobilization of rescue services, relevant NGOs, scouts and volunteers. 2. Evacuation of people and livestock to shelters/camps. 3. Camp management as per standard practices. 4. Relief distribution. 5. Precautionary measures for communicable diseases. 6. Activation of mobile health and education services for flood affectees. 7. Arrangements for early recovery including flood de-watering and early restoration of communication and essential services.
Recovery and Rehabilitation	
	1. Damage assessment of flood affected areas.

	2. Conduct post flood repairs or refurbishment of embankments/barrages/canals 3. Resettlement of population on build back better basis. 4. Complete restoration of communication and essential services.
Earthquake	
UCs at Risk	All UCs
General Description	1. An earthquake is a sudden shaking of the ground caused by two chunks of earth's crust sliding past one another. 2. Although earthquakes are short-lived, usually not lasting more than a minute, they can leave behind incredible damage. 3. Identifying potential hazards ahead of time and advance planning can reduce the dangers of serious injury or loss of life from an earthquake. 4. The earthquake hazard intensity for district Sukkur is "Low" 5. The earthquake risk intensity for district Sukkur is "Low"
Disaster Management Measures	
Preparedness	
	1. Identifying and inventorying weak buildings and structures especially in urban settings of the district and situation demanding action by concerned departments. 2. Preparation of landuse plans, town plans and implementation of building codes in new residential schemes, schools, public and private offices. 3. Implementation of DRR measures in public infrastructure development schemes. 4. Establishment of search and rescue infrastructure and services which can be mobilized as first responder in post-earthquake situation. 5. Mobilize NGOs, INGOs, community development organizations and volunteers, and conduct earthquake safety awareness campaigns and drills especially in main urban settings. 6. Availability of necessary material and equipment required for establishing temporary shelters with life support facilities i.e. mobile medical camps, schools, power supply, water and sanitation etc. 7. Availability of alternative communication system in case if usual communication means are disturbed by earthquake. 8. Preparation of medical emergency plan to manage mass casualties in case of any major earthquake event.
Response	
	1. Obtain firsthand information on intensity of earthquake and damages; prioritize areas for search and rescue operation.

	- Mobilize community-based volunteers, scouts and other trained personnel to hard hit areas to assess situation and help victims. - Establish emergency camps / shelters with necessary life support facilities. - Establish medical camps for provision of first aid and possible medical assistance to injured. - Evacuate people from damaged houses to safe places and shelters. - Provide security in affected areas and maintain law and order situation to prevent incidents of thefts and stampede. - Arrangement and conduct of aerial / drone survey of the affected areas. - Establish information and help desks for facilitation of affectees. - Restore essential services like power, water supply, and telecommunication of critical infrastructure like hospitals, control Rooms, etc. on priority basis.
Recovery and Rehabilitation	
	- Detailed damage and need assessment for recovery and rehabilitation. - Rehabilitation on build back better principle.
Heatwave	
UCs at Risk	All UCs
	- Heatwave is a condition of atmospheric temperature that leads to physiological stress, which sometimes can claim human life. - Sukkur is known for its extremely hot summers. Sukkur has a hot desert climate, characterized by very hot and hazy summers as the temperature can reach 50°C which creates problem for the individuals like heat stroke, skin burn and sometimes death of a person. - Dry heat is experienced starting April to early June until the Monsoon season starts to arrive. Monsoons in Sukkur are not very wet, but bring high dew points, resulting in high heat indices. - A severe heatwave, in 2010, engulfed parts of Sindh, including Sukkur. - A severe heat wave with temperatures as high as 49°C struck southern Pakistan in June 2015. It caused the deaths of about 2,000 people from dehydration and heat stroke, mostly in Sindh province. - Higher daily peak temperatures of longer duration and more intense heatwaves are becoming increasingly frequent globally due to climate change. Sindh too is feeling the impact of climate change in terms of increased instances of heat wave with each passing year. - Very high temperature not only affects vegetation but also creates problem for the individuals like heat stroke, skin burn etc. - According to MHVRA study 2022, heatwave hazard intensity for district Sukkur is “High to Severe” - According to MHVRA study 2022, heatwave risk for district Sukkur is “Low to High”
Disaster Management Measures	
Preparedness	

	1. Consistent future development strategy: Tree plantation, restoration of natural ecosystem, construction of environment friendly and well planned residential societies, offices, infrastructure and human dwellings. 2. Monitoring for hot weather alerts through local and international sources and issuance of timely Hot Day Advisories, and Hot Day Warnings. 3. Upgradation of major public health care facilities with necessary equipment and medicines to treat heatstroke patients. 4. Heatstroke awareness campaigns and wide public coverage through media, social media, SMS, NGOs and social welfare organizations. 5. Arrangements for uninterrupted supply of electricity and water in vulnerable areas.
Response	
	1. Mobilization of NGOs, social welfare organization and volunteers for arranging heatstroke facilitation camps and distribution of fresh drinking water in affected areas. 2. Local radio FM broadcasts to disseminate heatstroke safety and precautions. 3. Mobilize mobile medical teams for first-aid and other medical emergency support in affected area. 4. Record keeping of heatwave patients and fatalities.
Recovery and Rehabilitation	
1. Post event review of heatwave plan and modifications	
Drought	
UCs at Risk	All UCs
	1. Climatic condition of the district can be categorized as Hot and Arid (Climate Classification of Pakistan (Khan <i>et al.</i>, 2010) 2. Rainfall is very insufficient, average annual rainfall received during a year across the district is 96.5 mm 3. 55.8% of the total district area is covered with bare areas with sparse natural vegetation, Achhro (white desert) covers the east, south and west regions of the district. 4. River Indus is flowing along western boundary of the district. 5. Orchards are abundant, mostly at north and western corner of the district. Range lands with natural herbs and shrubs are mostly found at western side of the district. 6. Small water bodies are prevalent from north to south and at west. Natural vegetation is found along both sides of river bed scattered from north to south-west of the district. 7. Irrigated crop fields are at 20.92% of the total district area, scattered from north to south and at west. 8. Canal irrigation is prevalent, while river is also used for irrigation purpose.

	9. According to MHVRA study 2022, a. Meteorological drought hazard for district Sukkur is “Extreme” b. Meteorological drought risk for district Sukkur is “Medium to Extreme” c. Agricultural drought hazard for district Sukkur is “Mild to Extreme” d. Agricultural drought risk for district Sukkur is “Low to Extreme”
Disaster Management Measures	
Preparedness	
	1. Implement Drought Early Warning System (EWS) at provincial/district level to get clear indications of the impending drought and its consequences, e.g. forecast of impending drought conditions related to changing weather conditions linked to El Nino or La Nina events. 2. Implementation of water supply and demand management and encouragement of efficient irrigation systems in agriculture. 3. Research and promote drought resistant agriculture crops. 4. Resilience and improvement of adaptive capacity of farmers. 5. Monitoring of temperature, precipitation, potential evapotranspiration, soil moisture, stream flow, groundwater levels, lakes, and reservoirs for drought forecasting. 6. Control ground water extraction from upper and lower aquifers to be within the sustainable yield limits.
Response	
	1. Assess data about the nature of drought conditions and their impact. 2. Provision and installation of solar water pumps for availability of clean drinking water. 3. Public information campaign for water management and saving.
Recovery and Rehabilitation	
	1. Cash and in-kind support to farmers for next cropping. 2. Awareness and encouragement of farmers on best irrigation practices and water saving.

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Filed Work Photo Gallery

