

# Sustainability as a Response to Climate Change

## Lessons Learnt from Badin

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**Abstract** - The relative importance of sustainability can be measured with reference to climate change. Sustainability as an emerging science can strengthen the exploration on adaptation to climate change. The likely effects of climate change include the increase in extreme weather events like heavier precipitation which may leads to risk of heavier flood. Sindh is located in the most vulnerable region, which is prone to intense climate change and natural disasters. Historically, it has suffered from various disasters of both kinds including natural & man-made disasters. It ranges from floods to earthquake and riots to epidemics respectively.

The flood of 2022 has adversely impacted the province of Sindh. It has not only affected the lives of people but also destruct their houses.

### I. INTRODUCTION

Badin is one of the worst affected districts of Sindh. The devastating rains during about four week's period have created unprecedented situation of flood in Badin. The scale of flood has further complicated by the poor drainage system and the breeches in LBOD and irrigation system.

The focus of this paper would be on the identification of gaps between the disaster associated damages and the response to those damages. The main issue is that an effective coordination between the local government and the communities has been observed during the disaster, but as they have once recovered from the disaster, the process of rehabilitation is seeming to be slow.

In order to conclude it can be said that the sustainable development can only be achieved by identifying shortfalls and by addressing the risk and vulnerability faced by each

sector through the analysis of the baseline study of the city of Badin.

### II. OVERVIEW

The varied calamities that we face today can be resolved if cities and communities integrate dependable and innovative sustainability practices in building resilience against disasters. It enables a community to not only be able to cope and recover from it but also changes the perception of setting different priorities in the situation of disaster.

Sustainability, as an emerging science, can strengthen the exploration on adaptation to climate change. The likely effects of climate change include the increase in extreme weather events like heavier precipitation which may leads to risk of heavier flood.

The research methodology included physical and social surveys. Information was gathers through interviews and questionnaire surveys. The current paper will examine the role of local authorities of Badin in strengthening the resilience of their city services and local communities to a changing climate – adapting to climate change.

Local authorities have two critical roles in tackling climate change:

- strengthening the resilience of local services and local communities to extreme weather – adaptation
- Assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery.

In order to have a review of major disaster related issues within the overall region of Sindh, the following insight will take forward,

### III. CLIMATE OF SINDH AND RISK OF DISASTERS

The Province of Sindh is located in the South- Eastern part of the country (between Lat 23-35 and Lat 28- 30 N). The geographical area is 14 million hectares out of which almost 8.0 million hectare is cultivable, and the remaining area is not available for cultivation mostly lying in the northern hills of Khirthar Range, eastern desert of Thar Desert and AchharoThar and the riverine area.

Sindh's 60% land area is arid. Annual average precipitation is 5 inches yearly. The mighty River Indus flows in the middle of the province. There are seasonal streams which become active in the monsoon season, they emanate from the Khirthar hill range from west of province, which fallout in River Indus and Arabian Sea. The boundaries of Sindh are touched by Arabian Sea in South, India in east and Punjab in north and Baluchistan in west. (Sindh Provincial flood/monsoon Contingency Plan)

The province of Sindh has historically suffered from both natural and human induced disasters. The high level of risk is mainly from floods/ heavy rains, cyclones in coastal area, sea intrusion, droughts, earthquakes, epidemics etc. In addition to the natural disasters, Sindh is vulnerable to following man-made disasters which includes Accidental Fires, Epidemics, Environmental Degradation, and Political Riots.

#### Map of River Indus Passing Through Districts of Sindh Province



**Figure 1:** map showing the river Indus passing through districts of Sindh province

**Source:** Sindh provincial monsoon/flood contingency planning, 2011. department of rehabilitation, PDMA, government of Sindh.

### IV. BADIN CITY-INTRODUCTION

District Badin is one of the key districts of Sindh. It is bordered by the Thatta and Hyderabad districts on the west, the Arabian Sea on the south, the Rann of Kutch, which also serves as the country's international border with India, and the Hyderabad and Mirpurkhas districts on the east. With a total size of 6,726 square kilometers, the district is made up of the talukas Badin, Matli, TandoBago, Golarchi, and Talhar.

Due to its proximity to the Indus River delta, the district's southern portion has a lower land surface than its northern half; the district's overall elevation is roughly 50 meters above sea level. The district is a section of the Lower Indus plain, which was created by the Indus River's alluvial deposits.

In Badin, the media is a significant channel for communication. It consists of print media such as newspapers, books, pamphlets, brochures, magazines, etc. as well as electronic media such as radio, television, videocassette recorder, and cable system. In the years 1999 to 2000, Badin registered 3950 television licenses. There are also two weekly newspapers published.

Sukkur barrage and Kotri barrage, two well-known barrages in Sindh, are used to water the district. The sea wind, which blows from March to October for eight months of the year and keeps the hot heat relatively cool, helps to soften the district's generally moderate temperature. Although the sky is gloomy during the monsoon season, there is not much rain. Summertime weather is typically muggy and humid. The start of November marks the beginning of Badin's cold season when a rapid shift from the humid sea breeze to the dry and chilly north-east wind results in an abrupt drop in temperature. In hot weather, the highest temperature rarely rises beyond 40°C, and in cold weather, the lowest value never drops below 8°C. It begins in September and lasts for one and a half months.

Considering that Badin district is part of Sindh, it is vulnerable to cyclones, coastal floods, high rains, sea infiltration, and hydrological as well as meteorological droughts. Compared to other rural areas, the coastal areas are more at risk. 370,000 people live in a danger zone, which includes the 215,080 acres of affected area, while 294 Dehs are directly impacted by all current calamities. The Badin district is vulnerable on both structural and non-structural levels.

The District Administration Setup comprises of The Zila Nazim, the head of the District Government Badin, while the District Co-ordination Officer is the Coordinating head of District administration. Badin is the district headquarters headed by the District Co-ordination Officer with revenue set-up of five talukas. Each Taluka is headed by Deputy District Officer (Revenue) in addition to Taluka Municipal

Administrations which are responsible directly to respective Taluka Nazims.

Taluka is an administrative division of Badin.

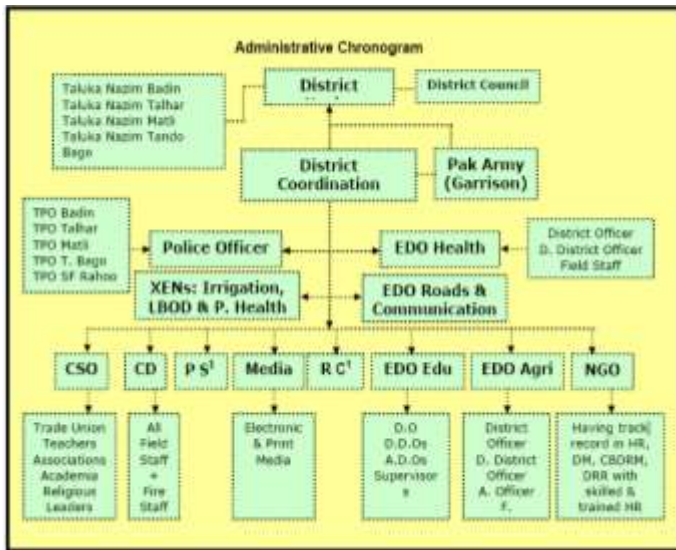


Figure 2: Chart showing the administrative structure of District Badin

Source: Disaster Risk Management Plan, District Badin, PDMA, government of Sindh.

## V. PROCESS OF DISASTER MANAGEMENT IN BADIN

The government was given the power to handle disasters by the Calamity Act of 1956, yet up until recently this power was only used temporarily during emergencies. The Badin district government examines its emergency planning each year prior to the onset of monsoon season. The district administration keeps an emergency cell (EC) at the DCO district office in accordance with the contingency plan.

The education sector is playing an important role during the disaster as all the main government school buildings work as a source for providing temporary shelters to the flood affected people. All the main staff of the education department is supervising the management of these people, that either food or other necessities of life are available for them.

The head master of the government school also helps in communicating the early warnings about disaster to the communities, as the authenticity of his statement is more than any ordinary person.

An informative overview on DRR is lacking in the main curriculum of the secondary level education. For reference, a similar exercise has been preciously done in the situation of wars, so this time it may also work for the benefit of community development & preparedness for such kind of disasters.

In the event of unforeseen or unexpected problems, they first set up a control room at the DC office and later one in each taluka that is operational 24/7. One representative from the departments of health, education, revenue, and social welfare is assigned to each control room. Any affected person can easily access the control room in the event of an emergency because their telephone numbers are made available. For instance, the personnel of the tax department may advise someone with health issues to a medical camp. Young people who volunteer perform crucial roles. If a family is unable to reach them, the volunteers first provide them with cooked food before rescuing them via boats or helicopter and transporting them through trucks to school shelters or tent cities.

## VI. DISASTER MANAGEMENT ISSUES IN BADIN

The Badin local government is well-equipped with information and capabilities for disaster and climate risk reduction, but it has to be shared with the local organizations and community members, i.e. local activists in the community. There are very few organizations functioning in the DRR sector, but there are no solid partnerships that are effective from the beginning, which means that local organizations must first take the initiative on their own before approaching the revenue department or local government for approval.

If the local organizations involve the local government on the initial level their partnership produce better results regarding DRR initiatives. They do have an allocation of budget for DRR that is about 2% but it is not being utilized to provide incentives for the public and private sector to invest in risk reduction. It is only being used in the management works during the disaster.

One main issue that is observed during the survey of the city by the author is that an effective coordination has been perceived during the period of disaster, or the people are willing to provide incentive to the low-income families but as they once recovered from the disaster, the process of recovery works are seems to be very slow, and eventually the time for next disaster is almost there and the community has not been recovered from the impacts of the last disaster.

Local government also conduct disaster assessment for various development sectors like agriculture, livestock, households...etc. but only once i.e., at the time of disaster but they are not regularly updated on any basis.

The District Badin local administration has undoubtedly determined which of its economic sectors is most susceptible to potential disaster effects, in most of the cases it is obvious, which is mainly agriculture and livestock and secondly some industries which are again dependent on agricultural products.

But there is no micro-insurance facilities are available for their survival.

The majority of the time, communities lack access to knowledge on things like catastrophe risk reduction, adaption strategies, and vulnerability. but they do get the forecasting of the climate change and early warnings about the disaster but even the warnings are the unwavering statements, like if the district government is alarming the citizen about the intensity of upcoming disaster saying that 'the city is not safe please evacuate', then at the same time some political leaders within the city create contradiction in the given statement, which results in non-trustworthy impacts on the citizens.

Before the recent disaster there is no such thing like DRR, but after disaster a very few people are getting aware of it because of their training on DRR, and some local organizations are taking initiatives and working on DRR planning and management, producing DRM plans and all.

A community flood management committee established in a local area and working in collaboration with the pertinent non-governmental organizations can significantly help to reduce the negative effects of floods, according to some of the pilot activities that focus on community approaches to flood management that are also found in Badin.

#### VII. POSSIBLE STRATEGIES TOWARDS SUSTAINABLE BUILT ENVIRONMENT PREPARED FOR CLIMATE CHANGE AND THE RISK OF DISASTERS.

Conferring that each and every element is at extreme risk during disaster like Humans, assets, crops, buildings etc. for that reason the existing plans and policies should have a component of DRR.

Currently no such thing can be called as disaster resilient even the NGO, s one room shelters provided to the flood affected people does not have the characteristics of being resilient to the expected disasters.

The local government including local organizations needs to work more and more for the effective planning and management of disaster risk reduction. The community involvement would also be supportive in policy making at local level like elder people could share their experiences and women could share their experiences by discussing all the problems they and their families had to face during the disasters

For forecasting and early warning, earthquakes (which happen less frequently) are impossible to predict, while disasters brought on by extreme weather (such as floods, cyclones, and droughts) happen frequently depending on the commonality. For example, rain can be predicted through electronic media

(urban areas), while in rural areas announcements are made through mosques' and police cars' loudspeakers.

Bunds should make with the help of indigenous people to stop the flash flood. A reliable alert system should be set up so that messages can be sent to mobile phones, announcements made through mosque loudspeakers, and police mobiles. The revenue department and civil defense are overworked at the moment.

#### VIII. CAUSE AND IMPACT OF DISASTER

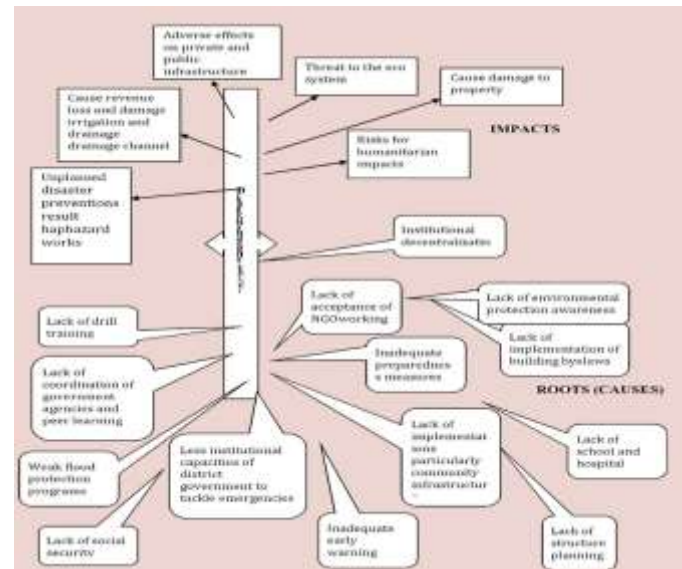


Fig.2 Problem Tree

Source: Author's analysis of Causes and Impacts of Disaster.

#### IX. ASSESSMENT AND ANALYSIS

**Strengths:** The local government in the district Badin is found to be very active as compare to the other cities selected for LG-SAT in the province of Sind. A large-scale Drill has been conducted in Badin in which a large number of citizens participated which make them aware about the disaster preparedness and train them how to rescue during disaster. The office of the DCO act as emergency center during disaster and the IDPS will be accommodated there and in the schools too.

Involvement of the village representative in the policy making was invited by the local officials. Micro credit schemes are launched by the private sectors. Assessment of the total damages is in form of human or property through the local NGO. The community has access to the information on vulnerability, disaster risk reduction, climate change adaptation measures, forecasts and early warning through local ngos network. Emergency control cell was setup in the dc office to make the DDMA functional, and facilitate



coordination with various departments and stakeholders. Camp management established relief camps in schools and colleges, and Tent Cities on the open grounds. Community based organizations (at village level) are very active and work on their rehabilitation with the support of the local NGO.

**Weaknesses:** The effective development can only be seen within the district but the lines in departments have not been effectively developed.

Lack of coordination has been observed between the NGO's and the government which will help in the overall effective development of DRR. Both are working separately right now, indeed participatory approach from both of the sectors will help in building the resilience of the city.

The manmade disasters happening in the city have not been taken intensely like the major political riots that may take the face of a disaster, create panic and chaos in the city. Epidemics may also be taken as disaster

**Opportunities:** The use of information technology can be incorporated to improve the early warning systems in the city. NGO's works can be share with the local government for the team work approach.

Few NGO's are working efficiently regarding disaster; their work can be shared with the government which will enhance their efficiency in making DRM plan.

Local farmers are well aware of the routes of risk to their agricultural land which can be share on the local level similarly their experience can be share in marking safe evacuation routes.

**Threats:** The local government does not have access to resources to assess victims of psycho-social impact of disaster. The safe evacuation routes are not identified on maps officially. There is no annual budget for the disasters; the state releases emergency funds whenever it is needed. Civil societies and local government do not contribute to support environment and ecosystem. The local government does not provide in-depth training in risk reduction for local officials, community leaders, and school/college students as the students do not have education on disaster and climate change. The land use regulations and building codes are not enforced on all building types in fact the building byelaws exist.

#### X. IDENTIFIED GAPS

To achieve sustainable development there is a need to identify shortfalls and to address the risk and vulnerability faced by each sector through the analysis of the baseline study. Based on analysis, gaps and challenges have been identified as under:

- District government/administration lacks the institutional capacity to address emergency management-related challenges. Awareness levels are low especially in rural areas, which are facing serious risks
- The development plans do not update and improve the disaster risk management
- Weak coordination among the development and relief agencies
- Rare participation of elder people of the vulnerable communities in various mitigation and planning process.
- Lack of adequate arrangement for early warning system on various levels.
- Poor technical knowhow among stakeholders
- Health and hygiene issues should be properly addressed.
- Lacking of livestock proper shelter
- Rehabilitation of land and irrigation infrastructure
- Critical funding gaps and lack of financial instruments like micro-insurance.
- School must ensure continuation of education during the transition period.
- Building byelaws implementation is only in the official documents. But no implementations.

#### XI. CONTINGENCY PLAN FOR RESCUE AND RELIEF PHASE

- Relocation of people living in areas
- Control rooms should be in rural areas on raised ground to perform coordination and information management functions.
- District level food stock quantities and locations should be identified.
- Lighting arrangements at vulnerable sites.
- Wireless communication arrangements should be in affected areas
- Trained local youth for the rescue purposes

#### XII. RECOVERY PHASE

- Assist the people returning back to their homes with financial incentives
- Use of sand bags (non-structural) to stop flood water
- Educational buildings (schools/colleges), which had been used as relief camps, need repair and maintenance regularly
- The line departments of the local administration should coordinate each other more frequently to share their future plans and shortfalls of previous works and effective implementation strategies.
- The strengths of a district local government can be used by other district local government to overcome

their previous gaps should be through mutual trainings to their human resources.

**XIII. REHABILITATION PHASE**

- Bunds require complete repair and reinforcement (structure)
- There should be the trainings on awareness raising activities to civil servants, technical staff, NGOS, media, elected representative, volunteers, and local communities. The main purpose of the training should be to develop an understanding about disaster preparedness, response and overall disaster risk management.
- Mapping of all the sensitive flood disaster prone areas and threatening water channels should be done.
- Training of Para-medical staff for emergency.
- Enforcement of the building byelaws and regulations.
- Encourage communities to improve their disaster coping mechanisms. To lessen the suffering caused by various types of disasters, the focus should be kept on local populations, particularly women, children, and the elderly in rural villages. Incorporating community-based disaster management within the process of participatory development
- Good practices of peer learning among district local government, local NGOS, village based committees, and young volunteer groups should be repeated on regular bases

**XIV. FUND RAISING STRATEGIES**

To adequately support the program in a sustainable way, the Provincial Government should allocate emergency funds in the budget in 'Disaster Management Fund' on permanent basis

LOCAL ACTIVIST	GRASSROOT NETWORKS	NATIONAL AUTHORITIES
Community Representative (on UC Level)	Youth Groups	NDMA (National Disaster management Authority)
Social Activist	Community Based Organization	PDMA(Provincial Disaster management Authority)
Political Activist	Non-Governmental Organization	EDO Community Development Department.
School Head Master/ Head of the area Mosque	Disaster Management Committee	
Livestock Extension Worker		
Agriculture Extension Worker		
Retired Government Teacher.		

in Disaster Risk Management Plan Sindh, like Sindh Relief Fund, Sindh Governor's Relief Fund, and disaster mitigation budget. Besides this support, from external (international humanitarian organizations) sources and with the additions annually through donations is also expected. Its operation, monitoring should be done by Director General PDMA. The proposed fund (at district level) should be governed by a committee under the Chairman PDMA, which may take decisions on urgent basis. But in case of emergency, the DG PDMA should have power to release extra amount as per emergency. The college and university students can play a vital role for emergency fund raising. One day salary collection of government employees is also a very good practice to raise funds.

Based on the various interviews, a matrix is evolved translating the three main groups of participants/stake holders involved in DRR planning and management.

**XV. CONCLUDING REMARKS**

It is crucial for the execution of any local disaster risk reduction measures to deal with various stakeholders and several tiers of government with all the active dedication and leadership of a local government. A comprehensive disaster risk reduction measure frequently takes a long time to implement in full, and local government leadership is especially important to maintain political momentum and

support from outside stakeholders throughout the process. National policy making in this context remains a major challenge that can only be met with increased international funding for adaptation and disaster management.

Financial instruments like micro-insurance could be an important part of adaptation, but a new risk perception is needed - both locally and globally.”

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