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HE 6102:DISASTER RISK REDUCTION AND COMMUNITY RESILIENCE

TERM PAPER

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HE 6102 : Disaster Risk Reduction and Community Resilience

Term Paper

Abstract :

The objective of this study is to examine the levels of resilience in five adjacent districts with regards to disaster risk reduction (DRR). The approach employs three resilience domains, including Absorptive, Adaptive, and Transformative-Capacity , to identify distinct indications within each domain. A resilience map is created by utilising these indicators, which visually represents the initial resilience levels of the chosen districts.Further, a manual enhancement of DRR indicators is simulated, and the subsequent impact on resilience levels is observed. The research concludes with the computation of percentage increments in resilience for every district, providing valuable insights into the potential consequences of optimising disaster risk reduction (DRR) strategies on overall resilience.

Introduction

Amidst a period characterised by escalating environmental uncertainties and recurrent catastrophes, the concept of resilience has acquired critical importance in reducing the detrimental effects of such events. The objective of this research initiative is to assess and contrast the resilience capabilities of five neighbouring districts—Noakhali, Lakshmipur, Feni, ,Chadpur & Cumilla—in a geographical area that is vulnerable to a wide range of natural hazards. The investigation centers on the evaluation of disaster risk reduction (DRR) indicators across three pivotal domains of resilience—Absorptive, Adaptive, and Transformative.

Each district selected for scrutiny bears unique geographical, socioeconomic, and infrastructural attributes, creating a diverse landscape for examining resilience dynamics. The definition of district-specific resilience profiles tries to discover the strengths and vulnerabilities inherent in respective disaster response and mitigation frameworks. By studying and comparing these districts' resilience indicators, this study intends to offer insights into the areas demanding improving for increased disaster preparedness and management.

The research employs a multidimensional approach, amalgamating quantitative data analysis and qualitative assessment to formulate a comprehensive overview of the districts' resilience. The study seeks to illustrate the potential consequences of enhancing disaster risk reduction strategies on the overall resilience of these regions by constructing a resilience map and subsequently improving hypothetical DRR metrics.This investigation has the potential to provide useful insights into the strategies and procedures that can strengthen these districts against the complex difficulties caused by natural disasters, thereby paving the way for enhanced regional resilience.

Methodology

Study area:

The study focuses on assessing disaster resilience in the five adjacent districts: Noakhali, Lakshmipur, Feni Chadpur, and Cumilla which are located in the southeastern part of Bangladesh.

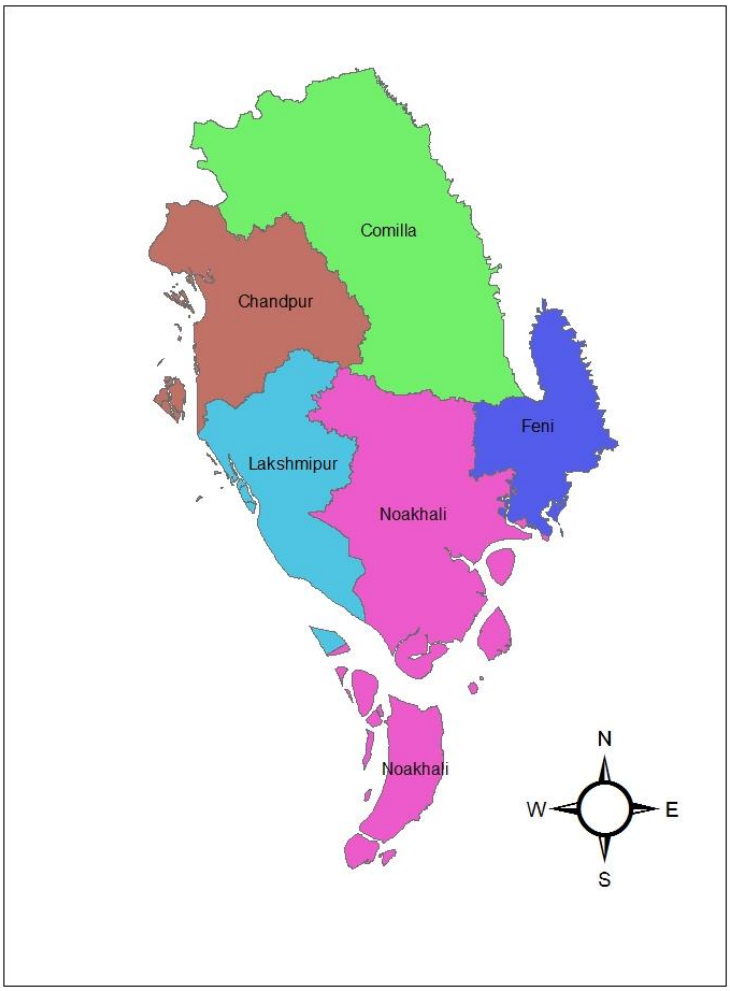


Figure: Selected 5 district as study area

Selection of Indicators:

Now we need to identify indicators.As we are working on three resilience domains includng Absorptive,Adaptive and Transformative Capacity.We need to identify their respective Indicators.Absorptive or coping capacity is a good strong first line of defence against events-it is a measure of how far an individual can cope with the changes during the disaster.Adaptive

capacity is the ability of an individual or community to adjust to changes,moderate potential damage or to take advantafe of opportunities without major changes in function or structutal identity.Transformative capacity is the ability to change substantially in the face of major and prolonged disturbances.

Selected Indicators in three three domains (Absorptive,Adaptive and Transformative Capacity)

Domain	Indicators
Absorptive Capacity	• Hospital(Govt&Private) • Flood camps & Cyclone shelters(Emergency response capacity) • Literacy rate(Community Preparedness) • Number of Doctors • Number of Co-operative Society
Adaptive Capacity	• Alternative Livelihood (Livelihood other than agriculture ,E.g.Various number of Industry), • Number of Insurance company, • Land area under irrigation (for paddy) • Number of Ponds &Dighee • Vocational Training institution • Rainfall (Monitoring rainfall pattern)
Transformative Capacity	• Number of Social Club • Media (Number of Published Newspaper and Television centre) • Number of Microfinance organization (Grameen Bank)

Now Indicators of these three domains will be used for Community Disaster Resilience Index (CDRi) calculation.First we need to distribute these indicators in 5 different capital to ultimately calculate CDRi.

Social Capital	**Financial Capital**	**Human Capital**	**Physical Capital**	**Natural Capital**
Social Club	Alternative Livelihood	Literacy Rate	Hospital	Number of Ponds
Media	Insurance Company	Vocational Training institution	Flood camps & Cyclone Shelter	Rainfall (To monitor rainfall pattern
Co-opertive Society	Microfinance Organization(Grameen Bank)	Doctors(Govt &Non Govt)	Land area under irrigation(For paddy)	Dighee

Calculations & Result Discussion:

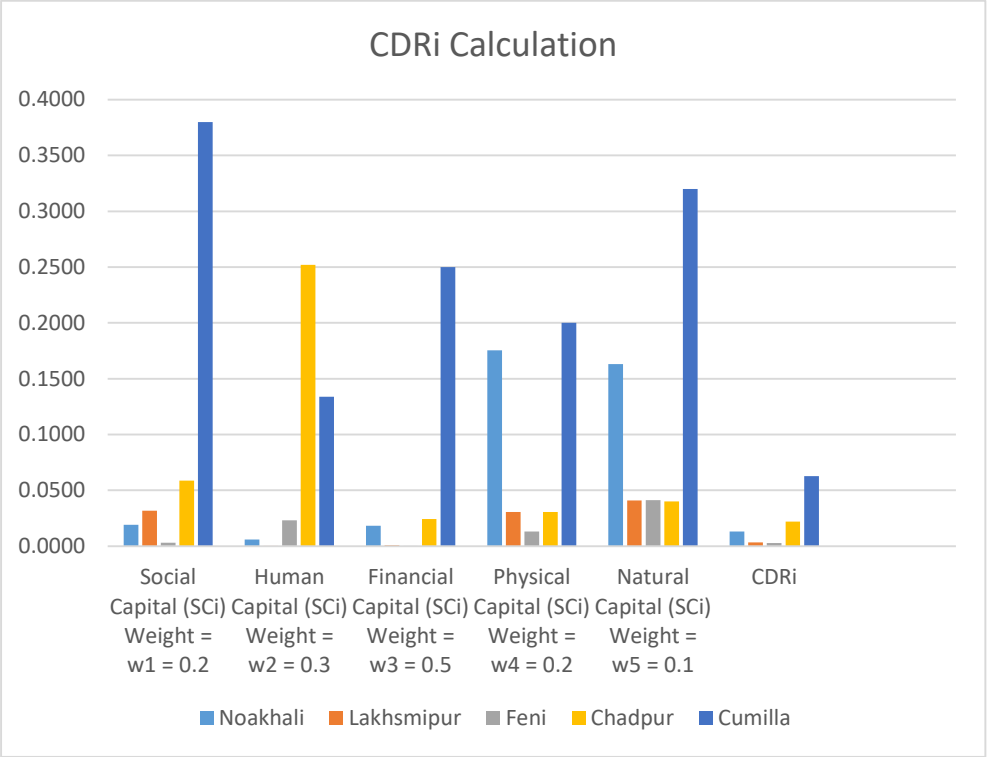
Community Disaster Resilience Index (CDRi)						
	Social Capital (SCi) Weight = w1 = 0.2	Human Capital (SCi) Weight = w2 = 0.3	Financial Capital (SCi) Weight = w3 = 0.5	Physical Capital (SCi) Weight = w4 = 0.2	Natural Capital (SCi) Weight = w5 = 0.1	CDRi
Noakhali	0.0190	0.0060	0.0182	0.1754	0.1630	0.013212778
Lakhsmipur	0.0317	0.0000380	0.0007	0.0305	0.0410	0.00338057
Feni	0.0031	0.0230	0.0001	0.0131	0.0412	0.0028611
Chadpur	0.0587	0.2519	0.0242	0.0305	0.0399	0.021898291
Cumilla	0.3800	0.1337	0.2500	0.2000	0.3200	0.06262308

Table X : Community Disaster Resilience Index Calculation

The Community Disaster Resilience Index (CDRI) is a widely utilized tool and methodology within the field of disaster preparedness and research. Its primary purpose is to assess and evaluate the resilience levels of communities when confronted with diverse natural and human-induced disasters.

In the Table X , We have calculated ,Community Disaster Resilience Index for the 5 location. The Community Disaster Resilience Index (CDRI) is specifically formulated to evaluate and analyze many elements that contribute to a community's capacity to effectively plan for, respond to, and recover from catastrophic events. A community with a higher Community Disaster Resilience Index (CDRI) score indicates a greater level of resilience, indicating its enhanced capacity to effectively manage and recover from disasters.In contrast, a diminished CDRI score would suggest that a community possesses diminished levels of preparedness, reaction capacity, and overall resilience, hence indicating a heightened susceptibility to disasters and potential challenges in recovering from their consequences.From Table Cumilla has higher CDRI value ,which shows a greater level of Resilience in Cumilla. And in contrast Feni has lower level of resilience which makes them more vulnerable to any disaster.If we closely monitor our Table X , We can see different Capital indicators dominating in different location.But Cumilla has higher value than other location in most of the Capital indicators.Financial capital is one of the major Capital Indicators which has higher influence in Cdri value as it has greater weight than all other indicators.Thats why if a location

dominating in Financial capital they are likely to be more resilient than other locations.But also this CDRi value depends on other capitals also but as natural capital has lower weight.It has lesser impact in CDRi which means it contributes very little in CDRi calculation.

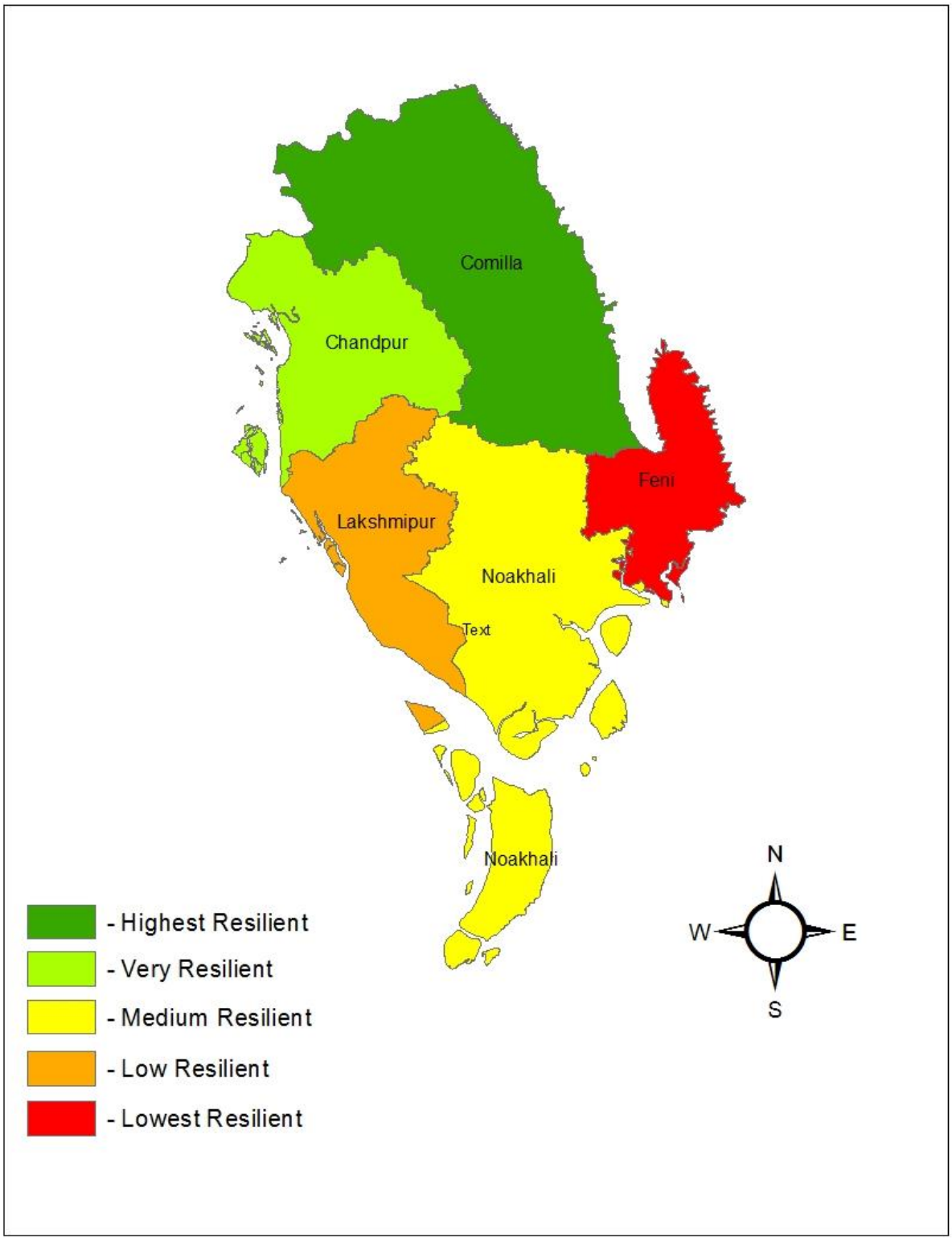


From the above chart it is clear how different indicators was dominating in different location and contributing in its CDRi value as a whole. Now ,if we closely Evaluate our CDRi calculation,We can see that ,CDR Index depends on some basic factors.These Are ,

- ✓ Numerical Value of Capital Domain
- ✓ Weight distribution of the Capital
- ✓ Number of capital domain considered

If we change a scenario, on these factors we can find different sets of result which indicates different sorts of impact of different indicators on Community Disaster Resilience Index.

Resilience Map:



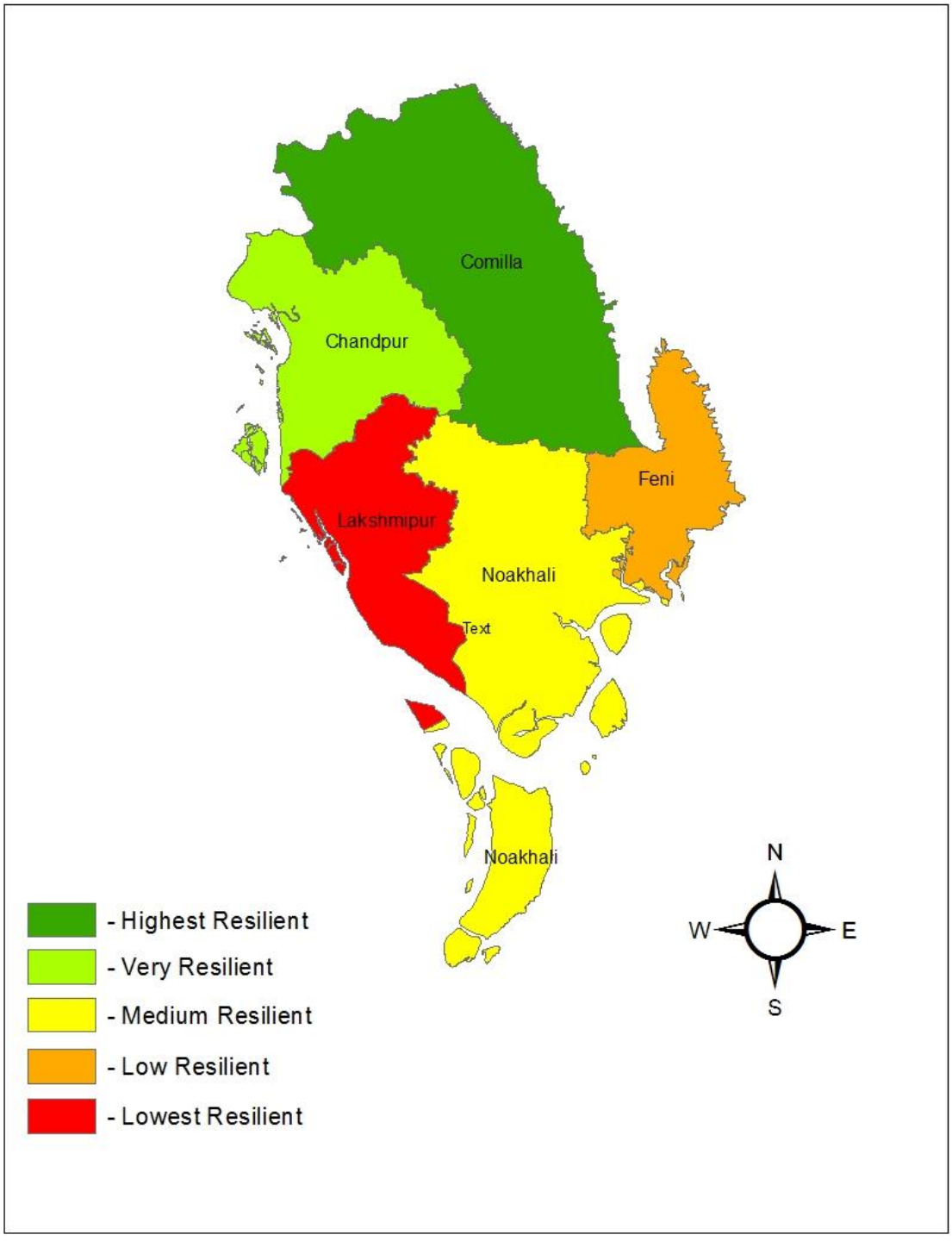
Now after increasing the indicators value manually,New CDRi value is calculated.

Community Disaster Resilience Index (CDRi)						
	Social Capital (SCi) Weight = w1 = 0.2	Human Capital (SCi) Weight = w2 = 0.3	Financial Capital (SCi) Weight = w3 = 0.5	Physical Capital (SCi) Weight = w4 = 0.2	Natural Capital (SCi) Weight = w5 = 0.1	CDRi
Noakhali	0.0266	0.0215	0.0181	0.1810	0.1539	0.014485357
Lakhsmipur	0.0273	0.0044324	0.0041	0.0244	0.0400	0.0035401
Feni	0.0028	0.0777	0.0000	0.0072	0.0403	0.005868715
Chadpur	0.0740	0.2500	0.0810	0.0654	0.0385	0.029443549
Cumilla	0.3800	0.1341	0.2500	0.2000	0.3200	0.062649246

Table Y : Community Disaster Resilience Index Calculation

Here ,after increasing the Indicators value ,it can be seen that CDRi value changes.Although This all depends on the amount of changes we made and weight of the indicators as well as weight of the capital domains.A significant changes occurred in CDRi value of Feni district district .Before the changes feni had lowest resilience but after the Changes in the value of indicators,CDRi value increases significantly and improves Resilience of that district which means vulnerability reduced.From the Percentage Increase Calulation,all these locations percentage increased,but cumilla increased very little amount as it is already highly resilient area

Revised Resilience Map:



Percentage Increase:

$$\text{Percentage Increase} = \left(\frac{\text{New Value} - \text{Old Value}}{\text{Old Value}}\right) \times 100$$

Now after calculating Percentage Increae we can find the Data given Below:

District	Percentage Increase
Noakhali	9.63
Lakhsmipur	4.72
Feni	105.12
Chadpur	34.46
Cumilla	0.042

Conclusion:

This term paper explored the essential elements of resilience in five neighbouring areas, with a particular emphasis on the absorptive, adaptive, and transformative dimensions. The resilience map was created using a comprehensive selection of indicators, offering a complete assessment of the existing condition of disaster preparedness and reaction capabilities. Through the manual improvement of Disaster Risk Reduction (DRR) indicators, a strategic approach was undertaken to address vulnerabilities and enhance the overall resilience of the districts.

The percentage rise in resilience scores, as determined by calculations, serves to emphasise the concrete effects of the improvements made in Disaster Risk Reduction (DRR). The districts demonstrated diverse levels of advancement, underscoring the significance of customising interventions to address the distinct challenges and resources of each community. The results of this study provide further support for the idea that resilience is a multidimensional and situation-dependent concept, necessitating careful and nuanced approaches for effective improvement.

In conclusion, the endeavour to build resilience necessitates the collective engagement of all stakeholders, the utilisation of accurate decision-making, and a constant commitment to the welfare of societies.

Reference:

https://bbs.gov.bd/site/page/2888a55d-d686-4736-bad0-54b70462afda/District-Statistics?fbclid=IwAR154KuBZC2LjSSsBNSeXa4dESziTTgerrZynnl-byyd5E7M4tcdDxwOf88