

Social Capital Based Resilience Framework for Communities to Disasters in Coastal Areas: A Literature Analysis and Case Study from Odisha Cyclone - FANI -2019

Tapaswini Mohapatra*

Abstract

The disaster victims received instant support, cooperation, and assistance from themselves. People in the communities assisted each other for survival before the government or any external help arrived. Social resilience, more than any other aspect of resilience, highlights the inherent contradiction between identity or persistence and transformation. In this research, we look at how this fear affects the development and application of social resilience in disasters. The reason of this investigate is the significance of social capital in defending the foremost powerless families and people amid disasters, as well as to apply an assortment of preventative and arrangement approaches to effectively oversee hazard and emergency circumstances. Rapid urbanization and shoddy development planning have increased communities' vulnerability to disasters, posing additional threats. Communities must get ready for and minimize dangers on a persistent premise in arrange to form flexibility and diminish the seriousness of calamity impacts and recoup speedier from catastrophe misfortunes. The study revolves around a case study as a prototype for understanding. In the years 2019 (cyclone Fani), men and women from various occupations participated in the data collection procedure. These findings may serve as an eye-opening truth for readers, researchers, developmental professionals, and policymakers as they work to construct a road map for building resilient communities. The study frames that an indicators model is absolutely necessary to quantify and measure social resilience and proposes a sample model of it. The paper is segregated in two sections, Section 1 - presents an overview of related and updated literature about the topic & gives basic intuitions behind the methodological framework. It is followed by Section 2, which speaks about a case study and a conclusive model.

Keywords: Social Resilience, Community Resilience, Disaster Management, Resilience Framework, Urban Planning, Climate Change, Cyclone Disaster

INTRODUCTION

Before, catastrophes were deemed "natural" and a well-known act of God, and people did little to avoid or mitigate the effects and consequences of disasters. As a result, the damage and destruction caused by catastrophes increased in severity and scale, making it difficult for the poor and disadvantaged to survive with dignity and livelihood possibilities. However, in the 1970s, a paradigm

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change occurred when world leaders, international organizations, development actors, and academics discovered that people's vulnerabilities and ignorance are the primary causes of bad consequences that can be minimized [1]. The disaster victims received instant support, cooperation, and assistance from themselves. People in the villages assisted each other for survival before the government administration or any external help arrived. The degree to which a community has the essential assets and is able of organizing itself some time recently, after, and

amid times of require decides its strength within the confront of potential risk occasions.

As the debate over the concept and practice of resilience continues, a rising number of academics and politicians are advocating that solutions to humanitarian needs should emerge from within impacted communities, or what is known as 'localised response'. In this respect, the World Humanitarian Summit (WHS) dialogs encouraged that compassionate help offices lock in in social flexibility and fortifying nearby frameworks [2]. Essentially, advise that understanding beneficiaries' resources and capacities necessitates close interaction and the development of empathy with impacted people, acknowledging their agency as they seek to heal and return to normalcy. Nevertheless, semi-urban environments, particularly in informal settlements and unplanned regions, are so diverse and complicated that improving absorptive, adaptive, or transformational ability necessitates a thorough grasp of the social context.

RESILIENCE FRAMEWORKS IN DISASTER CONTEXT

Social resilience systems have been created in a disaster setting as a result of distinctive ways of characterizing and conceptualizing social strength. The appreciation of different ideas used to frame social resilience in a disaster situation is serious. In the context of social resilience valuation, two recent reviews by Cutter and Sharifi emphasized common features used in disaster resilience frameworks. Their review focused broadly on [3] five commonly used dimensions of community resilience to disasters, i.e. social, economic, infrastructure, institutional, and environment. Though the review broadly covered the five key dimensions of community resilience, a comprehensive analysis of social resilience characteristics and indicators is limited. Among all the above dimensions Social Dimension is the strongest dimension that can bind and bring community resilience. The review of resilience assessment frameworks on the social dimension identified the following:

1. Social structure
2. Social capital
3. Safety and wellbeing
4. Equity and diversity
5. Local culture, as five sub-dimensions within the social resilience dimension.

CAPITAL-BASED DIMENSIONS OF RESILIENCE

For Community resilience, social capital has had the strongest influence. This is the module study called "community social capital" By definition, resilience is a multidimensional concept. To be able to operationalize the resilience idea, all metrics and their interdependencies should be included in a perfect environment. Six key societal resilience measurements have been identified, with few markers suitable to any calamity/disaster:

1. Social capital
2. Natural capital
3. Human capital
4. Economic capital
5. Political capital
6. Physical capital

Understanding and Applying the Concept of Community Disaster Resilience: A Capital-based Approach Published 2007.

These frameworks (Figure 1) have a predominant emphasis on social capital and are driven by the concept that different types of social assets can be attributed to key community resilience characteristics.

Out of the above dimensions, social capital is one of the most acceptable parameters because of the following reasons:

1. Social capital refers [4] to the linkages between individuals and groups, and the norms, common values, and understanding that strengthen them.

2. Social capital fosters resilience by allowing individuals and groups to assist one another in times of need.
3. In assured contexts, social capital allows people to depend on each other during times of necessity.
4. To start constructing any index the social factors should be studied at the initials.

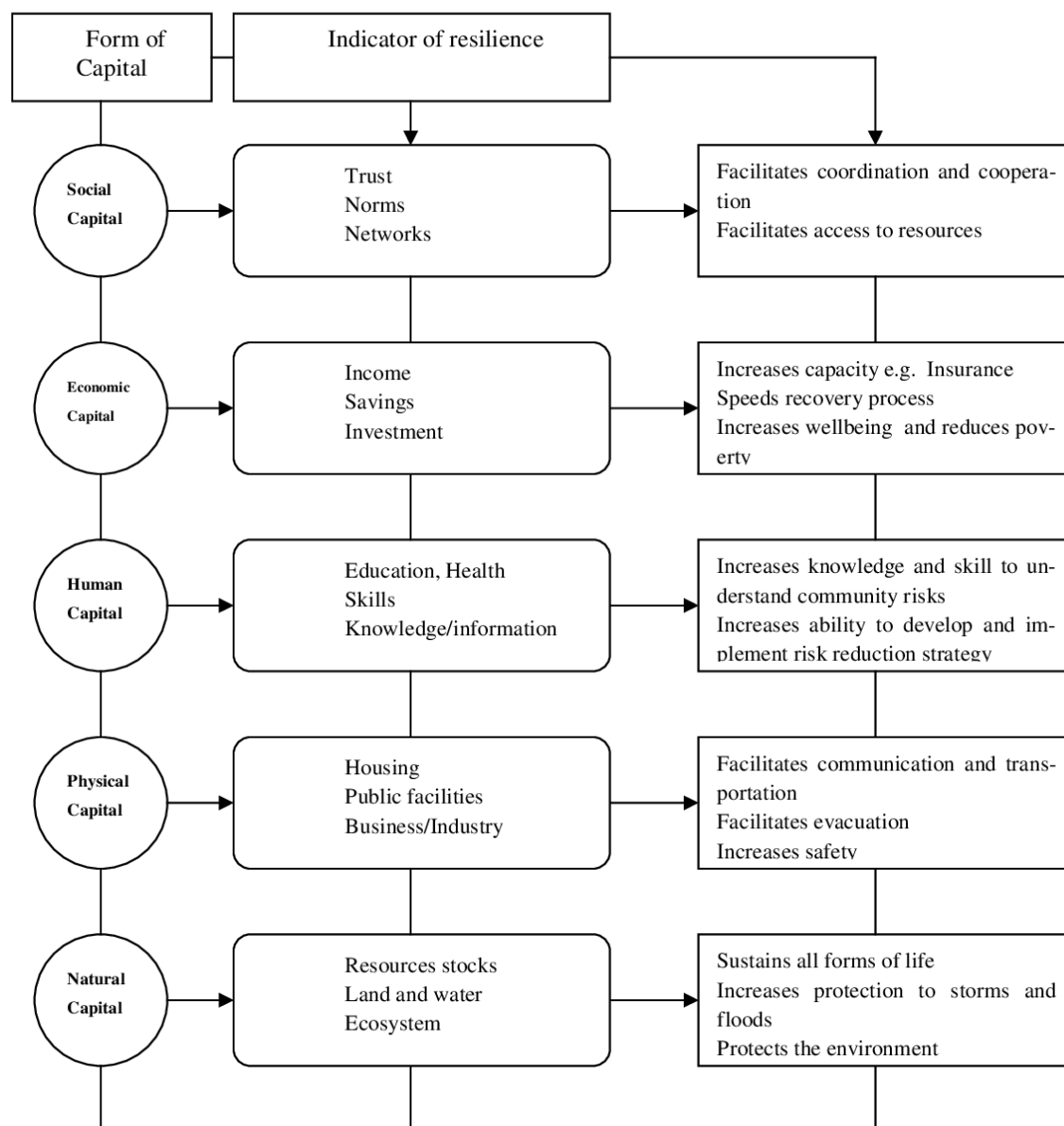


Figure 1. Conceptual framework on the relationship between capital domains and community disaster resilience.

SOCIAL CAPITAL

Researchers have mostly agreed that trust, norms, and networks are three critical components of social capital. People's trust in political institutions is as important as their faith in others. Social norms are different types of social support, helpful actions, and collective efficacy. Social networks are social links formed via group membership and associations that frequently enable individuals and social groupings produce benefits or profits.

The hypothetical thought of social capital, which was conceived as a asset of shared values, standards, believe, and correspondence, is especially imperative in settling struggle and challenges in collective activity and collaboration [5]. When a household acquires the capacity to decrease the mourning impact of a tragedy and is able to adjust to such a scenario in the aftermath of disasters, it is said to be resilient. "A community is resilient when it can work and maintain basic frameworks beneath push; adjust to changes within the physical, social, and financial environment; and be self-sufficient when outside assets are limited or inaccessible."

SOCIAL CAPITAL AND DISASTER MANAGEMENT

In spite of the fact that social capital could be a moderately unused word in disaster administration, it resounds with a number of other ideas found within the dangers and catastrophe writing [6]. Among these is community resilience, a phrase that has gained prominence in hazard and catastrophe literature in recent years.

When emergency officials do acknowledge the importance of the community in disaster management, the emphasis is typically on one of the four different phases of the disaster management cycle, with significantly less consideration given to the role 'community' may play in all four stages. In addition, [7] inadequately accentuation has been centered on the significance of social capital as a steady angle all through the emergency administration cycle. Clarke contends that, in the case of Hurricane Katrina, most of the catastrophe literature and discussion has focused on what happened during and soon after the storm, rather than before. The study of social capital in catastrophe research in general has suffered the same fate, with significantly less discussion about its significance in prevention and mitigation.

THE CONSTITUTION OF SOCIAL CAPITAL

The people-centered resources known as bonding, bridging, and linking capital are used to increase resilience at both the household and community levels.

1. *Bonding capital*: Social capital that binds together groups and people of the community.
2. *Bridging capital*: The term "bridging social capital" refers to the network of relationships that binds together groups that are socially, economically, and demographically distinct from one another.
3. *Linking capital*: Building links between community members and those in positions of authority and ability to mobilize resources during times of need and emergencies is known as linking social capital.

Bonding, bridging, and linking capital to individuals, groups, and communities provides prompt assistance and support, resulting in long-term development and resilience.

BONDING SOCIAL CAPITAL IN DISASTER RISK REDUCTION AND RESILIENCE BUILDING

The term "bonding social capital" (Figure 2) describes the connections that exist within and among families, groups, and communities that are emotionally connected to one another and share a shared identity, culture, or ethnicity [8]. Therefore, it relates to the nature, structure, and quality of interpersonal relationships. These relationships have an impact on one's physical and mental health, economic security, and level of happiness. These elements, or, to put it another way, the returns of social capital as a result of expressive activities, are what Lin claimed to be the results. Furthermore, in order to 'move ahead,' the urban poor in developing nations mainly rely on bonded capital.

Early warning, stockpiling, first aid, mock drills, and rescue operations are just a few of the disaster preparedness activities that are seen to represent the ability and strength that local non-governmental groups have helped people create.

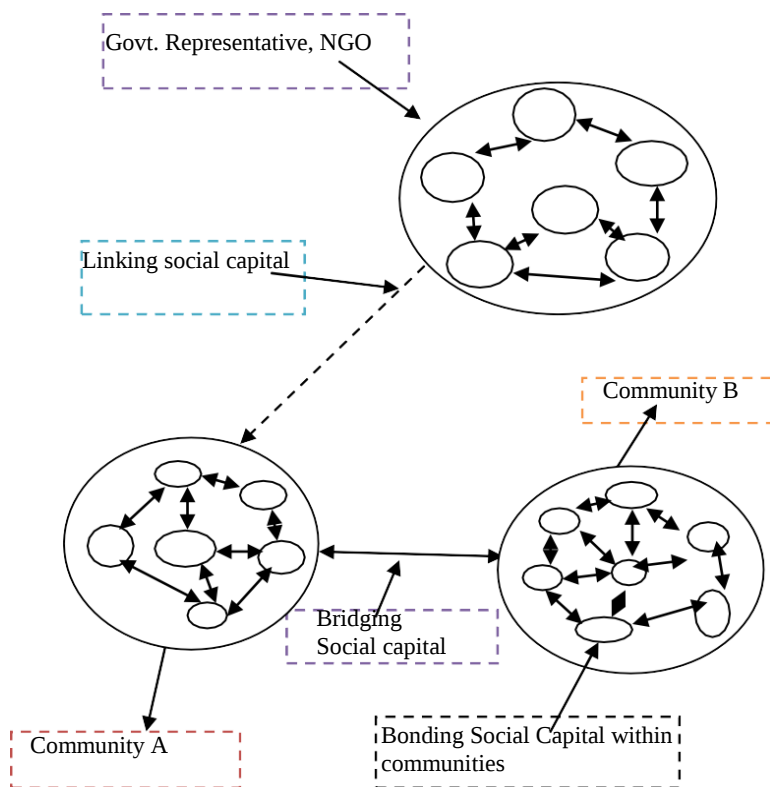


Figure 2. Bonding, bridging and linking social capital – a bubble framework.

BRIDGING SOCIAL CAPITAL IN DISASTER RECOVERY AND MITIGATION MEASURES

Building links between and among different bunches, communities, affiliations, instructive educate, non-governmental associations, and other substances with particular substances, convictions, and financial and natural changes is known as building social capital. Bridge capital is concerned with the connections between individuals that go beyond a common identity, such as far-off friends, coworkers, and associates [9]. Although bridging social capital is comparable to institutional infrastructure, it should be identified at the organizational level because norms, values, and social structures encourage more macro-connections there [10]. These ideals may be expressed formally or informally and in detail. In contrast to bonding capital, bridging capital focuses on "getting ahead" and involves many networks that might make members of other networks or localities aware of resources and opportunities that are present in one network.

LINKING SOCIAL CAPITAL IN DISASTER RECOVERY AND PREPAREDNESS MEASURES

"Linking capital" refers to the vertical relationships between official institutions and authorities. In order to distribute resources for the communities' residents' well-being, there must be a relationship between the communities and those in authority.

The state government, [11] led by the Odisha State Disaster Management Authority (OSDMA), issued an early warning after receiving a cyclonic warning from the local, state, and international meteorological departments. They then informed every community of the cyclone's planned landfall and launched an evacuation effort under the direction of the Odisha Disaster Rapid Action Force (ODRAF). Linking capital is concerned with how individuals, communities, and society institutions relate to one another—links to individuals or organizations at the top or bottom of the social scale. Relationships marked by power imbalances, the building of relationships with influential persons and institutions are referred to as having linking social capital.

These links [12] might be seen as hierarchical representations of social position, money, and power. Linking mostly refers to relationships between persons and groups within a society and build systems like governance, economics, and education. It entails interacting with people in positions of authority and is frequently a means of obtaining resources or influence.

THE CASE STUDY

Study Area – Geographical Context

Coastal Odisha, a 485 km long stretch of coastline, is located in the state of Odisha. The range is bounded to the north by the Lower Ganges (Ganga) plain, to the east by the Channel of Bengal, to the south by the Indian Ocean, and to the west by the Eastern Ghats. Odisha's 485 km of coastline puts the State at risk for floods, cyclones, and storm surges. The research area, including Puri, and its villages in particular, are particularly vulnerable to cyclones, storm surges, and flood because of the Bay of Bengal's proximity and the region's rivers, which make the area vulnerable to catastrophes.

Disaster Account of Odisha

- The history of catastrophes substantiates that around 80% of the State is inclined to one or more shapes of characteristic disasters.
- Odisha is always susceptible to cyclones in April-May and September-November.
- Once every few decades a super cyclone attacks Odisha. The last super cyclones to hit Orissa in the last 100 years were in 1942, 1971 and 1999.
- The 1999 super cyclone killed nearly 10,000 people and traumatized the millions who survived its wrath.
- More than 15 million people were affected.
- The Odisha State Disaster Mitigation Authority (OSDMA) promotes community-based disaster mitigation activities to help individuals prepare for disasters.
- OSDMA was established to coordinate post-super cyclone recovery work in consideration of future disaster preparedness needs.
- During the Super cyclone of 1999, 97 nos. block and 28 ULB and approximately 12,569,000 population affected.
- The total agricultural land affected was 1733000 hectares with 9885 nos. of human casualties

The Super Cyclone of 1999, Cyclone Phailin of 2013, Cyclone Hudhud of 2014, and Cyclone Fani of 2019 are the four enormous cyclones taken into thought for this reason. The information on the frequency of these cyclones in different districts was used to map the state's susceptibility. The frequency of cyclones in a particular district has been used as a base to establish the vulnerability of a district.

The vulnerability (in terms of the four cyclones only) of Odisha's districts is depicted (Figure 3). By implementing improved evacuation procedures and early warning systems, the state governments' readiness has contributed to reducing the number of fatalities in each one of them.

The Super Cyclone that crushed coastal Odisha in October 1999 was maybe the most noticeably awful ever common misfortune to have hit the state. When wind speed seethed at an evaluated 300 km per hour, [13] ocean water was spouting into the homes, without any plausibility of offer assistance from any quarter; villagers joined together to maximize synergies and confronted the disaster as a gather. They utilized their Social Capital, but the affect was so obliterating that it got genuinely marked. What caused more harm to the Social Capital was not the cyclone, but its repercussions. A few organizations got into the act of help and reclamation a few had their possess vested interface, a few had their tomahawks to pound, [14] for a few it was disaster tourism, for a few exposure in electronic media, a few needed to reach out to focused on bunches. Those communities which joined together battled the anger of nature; begun squabbling for help materials which was what smashed the Social Capital [15]. After the Super Cyclone, the state constituted Odisha State

Disaster Administration Specialist (OSDMA) to put in put a strong framework for disaster administration.

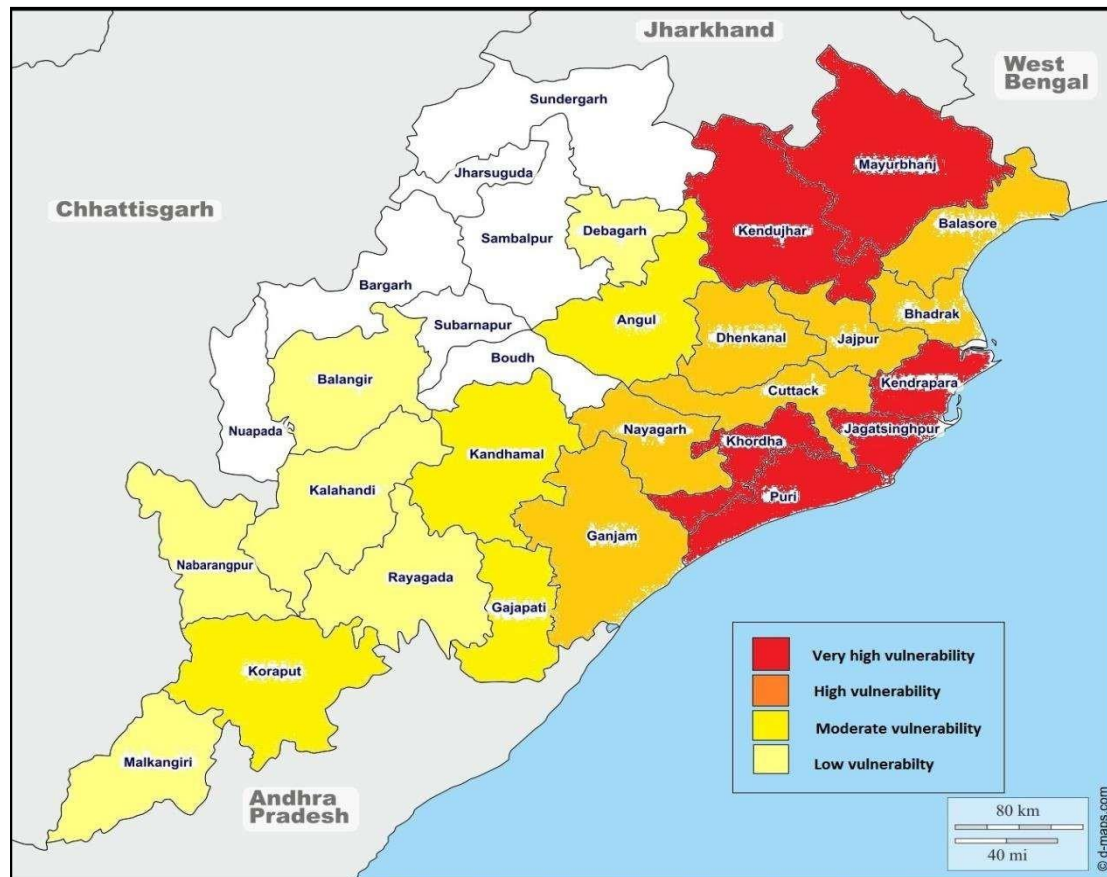


Figure 3. Vulnerability map of districts in Odisha. Classification of districts on the basis of vulnerability to cyclones Puri, Khordha, Jagatsinghpur, Kendujhar, Kendrapara, and Mayurbhanj are stated as high vulnerable districts.

Source: *Financing Resilience against Natural Disasters (ICRIER)*

Table 1. Criteria for classification of districts on the basis of vulnerability to cyclones.

Category	Classification	Colour code
Very high vulnerability	Districts that have been hit by all four sides	Red
High vulnerability	Districts that have been hit by any 3 sides	Orange
Moderate vulnerability	Districts that have been hit by any 2 sides	Yellow
Low vulnerability	Districts that have been hit by any 1 side	Lime Yellow

Source. *Financing Resilience against Natural Disasters (ICRIER)*

<http://icrier.org/pdf/FinancingResilienceagainstNaturalDisasters.pdf>

A Social Capital Restoration Project (SCRIP) was proposed to create utilize of existing Social Capital and produce more that would reinforce readiness and catalyze improvement activities.OSDMA alluded to Social Capital as (a) societal standards and ties those upgrade participation, believe and shared offer assistance in communities, (b) issues mindful for fruitful execution advancement exercises and (c) variables those play positive part in reinforcing community-based crisis reaction and post-disaster recuperation exercises. The method of Social Capital reclamation centered around [16] fortifying existing defenseless Community-Based Organizations (CBO) such as ladies self-help bunches, youth and shared-interest organizations counting cooperatives of ranchers, fisher people, drain makers, weavers, artisans and wage laborers so that it

may play a key part in fiasco readiness initiatives. The objective was to set up level and vertical linkages with neighborhood teach and nearby agent bodies.

But unfortunately till date not much social capital based rigid tie up repair initiatives is taken in concrete. So, this study will use early findings from a research project based mostly on secondary data collected in informal settlements in Odisha to highlight the characteristics of social capital as described in this work. Conducted in rural and informal semi-urban settlements of Puri district in 2019-2020.

Area of Study

This study was undertaken in one of the major six vulnerable districts of Odisha namely Puri.

The study is based on approximately case of 100 household's surveys (primary & secondary) during the cyclone Fani 2019 [17]. Quantitative and quantitative information regarding household livelihoods, household income and spending, shocks, and coping mechanisms was gathered in all from preliminary surveys and from 12 reports & research articles. The research was conducted precisely on the case study of 2019 (cyclone Fani).

Data and Methods

The study is based on qualitative & quantitative data from majorly secondary sources Focused group discussions and key informant interviews (KIIs) were employed to gather primary qualitative data (FGDs). To comprehend the function of social resources that were previously employed in emergency circumstances, secondary data was gathered [18]. Focused group discussions, key informant interviews, and observation were among the primary qualitative data gathering techniques employed by the researchers. Participants in the data gathering procedure included men and women from a variety of occupations that were severely impacted by flood and cyclone disaster in the years 2011 (great flood), 2013, and 2019, respectively (cyclone Fani).

Methodology

Review of literature is done purely through qualitative research methodology. The researcher tries to assemble significance information and discoveries on the part of social capital in disaster hazard management and through auxiliary source of writing audit from 54 significant articles (as a part of literature data). The Result so obtained out of the survey and study in the case study, are synthesised to give discrete information about the real time situation. Descriptive statistics was involved in summarizing data in the data analysis process and describing the main features of the result, such as the key issues and indicators in the case study. Descriptive statistics provided an initial overview of the data.

Population and Sample Size

An important decision that had to be taken was adopting the sampling technique as regards the size of the sample. The size of the sample meant the number to survey from the population for investigation [19]. The test estimate is decided by the level of confidence as well as the sum of the budget. The bigger the test, the more likely the reactions will reflect the add up to universe beneath study. It is interesting to note, however, that a small sample can often provide highly reliable findings, depending on the sampling procedure adopted. Based on the pilot study, the sample size can be determined. The population selected for this study is from the coastal area communities of Puri town and 3 subordinate villages (Nimapada, Chandanpur, Shakhigopal). N=100

SOCIAL CAPITAL BASED RESULT ANALYSIS OF THE DISASTER

Bonding Capital

The necessities of the (Figure 4) home are met by just one breadwinner for more than half (70%) of the population in the villages. Three to more than eight people may live in one family. This

demonstrates how families must have strong bonds in order to survive. The presence of relatives like brothers, sisters, sister-in-laws, and cousins in the neighbourhood suggests that the locals depend on their extended family for survival. This has implications for bonding capital.

Infrastructure, personal belongings, food grain, saved seeds, and sources of income were all devastated by Cyclone Fani [20]. They want to go out and work hard to survive, yet the worst coronavirus never permitted people to leave their homes to protect life. On the one hand, people want to go out and work hard to survive.

Bonding social capital at this turbulent time served as a sort of glue, keeping impacted families, friends, and neighbors together and providing them with hope during times of despair by facilitating all types of basic needs, aid, and support.

Chart Number – 1: Types of support extended by bonding social capital, finding from primary and secondary data, during Fani2019:

- Neighborhood discussion about the disaster
- Neighborhood alert
- Neighbor rescued
- Relatives raised temporary shelter
- Neighbor provided cooked food
- Relative helped cleaning debris
- Neighborhood sheltered the homeless
- Self-help groups helped financially
- Neighborhood helped in livelihood re-generation

Table 2. Several Indicators of bonding capital are identified based on the above parameters and study conclusion form Fani 2019, the following analysis from the case study: Attributes of bonding capital in risky circumstances can be created.

Form of social capital	Dimension	Key issues	Indicators (in vulnerable contexts like that of Odisha in semi-urban and rural informal settlements)	Sub indicators (Detail of factors / criteria in the major indicators)
Bonding capital(micro and cognitive level)	Personal connections (quality, structure, and type of relationships)	Trust norms (specific trust among familiars, strategic trust, civic/institutional trust)	The fraction of households that rely on others for assistance (e.g. for treatment, care and support)	• Size of the family • Structure of the family • Income of the family • Senior citizen in the family • Kids below 15 in the family • Woman in the family • Specially abled in the family
		Norms of reciprocity	percentage of people who have faith in other people's abilities (e.g.	• Income structure of the family

			breadwinners and other income earners)	Number of fellows having reliable income
			Proportion of individuals who provided and received support (e.g. sharing food, remittances)	Number of active fellows in the family
			percentage of people or families using possessions as a coping mechanism percentage of people who use credit to buy food as a coping mechanism percentage of homes concerned about food	
		using social media (types, size, spatial, structural, relational)	Centrality (degree, between, closeness) (degree, between, closeness) people's perceived importance Distance, or the degree to which people are related Network characteristics (such as attractiveness and success	Access to roads; connectivity; knowledge of networks and channels; connection to SHG;
	Social influence (conformity obedience compliance)	Normative (change to fit in a group—to be liked or accepted) Informational (change because of desire to be correct, belief that others have right information)	Proportion of individuals who changed thoughts, attitudes, feelings and behavior because of interaction with others; doing things for others with a choice to deny; doing things for others without an opportunity to refuse.	- Helpful neighbors - Helpful youth - Women getting involved - Basic skills of damage repair - Vocational & construction skills

Bridging Capital

It was determined that the parameters included in (Table 3) were pertinent for bridging capital. Building relationships between and among various groups, communities, associations, educational institutions, non-governmental organizations, with varied entity, ideology, socio-economic and environmental variance, is known as building social capital (UN-ISDR, 2011) [21]. Bridging capital is what happens when relatives and neighbors from various places provide their assistance to lessen the affected people's need for survival. In both pre- and post-disaster scenarios, the involvement of NGOs and other institutions as bridging capital is important.

Chart Number – 2: Types of support extended by bridging social capital, finding from primary and secondary data during Fani2019:

- Youth rescued families
- Relief provided
- Leaders acquired with skills
- shopkeeper supported

Based on the above secondary data theory the table of social capital index can be framed as below

Table 3. Several Indicators of bridging capital are identified based on the above parameters and study conclusion form Fani 2019, the following attributes of bridging capital in vulnerable contexts can be developed – Analysis from the case study.

Form of social capital	Dimension	Key issues	indicators (in vulnerable contexts—semi-urban and rural informal settlements)	Sub indicators
Bridling capital (meso and structural level)	Local institutions, groups, and organisations (quality of local groups and institutions)	Participation and membership in a group Regulations and rules Collaborative efforts Civic and political participation	Involvement in political parties, social groups, and other organisations Youth activities, such as voting Mechanisms for decision-making	• Presence of Youth leaders in the community • Funding to the youth party • Emergency budget organization • Learned youth participation • Qualification of youth

Linking Capital

“Linking capital linkage is about relationships with official bodies and institutions in vertical manner ”. “These vertical ladders are said to represent power and positions based on power, wealth, and social prestige”. (Table 4) Interfacing social capital may be a relationship between communities and people in positions of specialist and impact who may convey resources for the well-being of the individuals within the communities. The state government, led by the Odisha State Disaster Management Authority (OSDMA), issued an early warning after receiving cyclonic warning information from the state, national, and international meteorological departments, informed every community about the cyclone's scheduled landfall, and launched an evacuation drive led by the Odisha Disaster Rapid Action Force (ODRAF).

Chart Number – 3: Types of support extended by linking social capital, finding from primary and secondary data during Fani2019:

- Early warning
- Evacuation
- Relief provided
- Cooked food
- Housing support

Table 4. Several Indicators of bonding capital are identified based on the above parameters and study conclusion form Fani 2019, the following attributes of linking capital in vulnerable contexts can be developed – Analysis from the case study.

Form of social capital	Dimension	Key issues	Indicators (in vulnerable contexts—semi-urban and rural informal settlements)	Sub indicators
Linking capital (macro level)	institutions and organisations in society Processes in society (existence of institutions, quality of and access to services)	systems of education, government, and justice Political and civic participation	Microfinance institutions, education, health, security, the market, and religious institutions all exist. The percentage of persons who vote in elections	• Presence of gramin bank • Presence of market • Presence of social community body • Local bodies
	Governance, rules, regulations, guidelines, and tactics Availability of resources and services to individuals and groups		Rules, regulations, policies, and legislation Partnerships and networks formed by individuals and communities with those (individuals and organisations) wielding power, resources, and influence % of people having a consistent source of income (e.g. regular monthly income, stable business) Percentage of people who have access to schooling	• Involvement of locals in the voting system

CONCLUSIVE ANALYSIS FROM THE CASE STUDY

Chart Number – 4: Contribution of bonding, bridging, linking capital in disaster risk reduction and resilience planning at a glance during cyclone FANI – 2019, in Puri district of Odisha state.

DISCUSSION

Individuals, groups, and community members can enter into someone's difficulties with the aim of resolving them, and they can demand a similar action in return [22]. Social capital is a human network in which interpersonal relationships serve as a foundation for developing the link of love that encourages people to stand strong and help others in the face of natural or man-made calamities. Regular interface meetings and seminars are required between connecting and bonding capital to trade and share the issues, concerns, and challenges that linking capital must solve. State and national governments are tasked with playing a crucial role in disaster management in the lead-up to, during, and after a disaster, according to disaster management legislation. Concurring to catastrophe history, individuals are the primary partners to arrange for, react to, and recuperate from disasters' destructive results and impacts.

1. It is necessary to prepare a Disaster Resilient Guideline with a disaster-resilient index comprising Index Parameters of social resilience of the coastal communities with regard to the dimensions of community resilience.
2. The guideline so prepared can be used to provide a general framework for social resilience based on different factors like social capital etc. With the aim of enhancing resilience within communities throughout the three disaster phases.
3. The guideline can be referred to and implemented during a disaster outbreak for smooth disaster management.

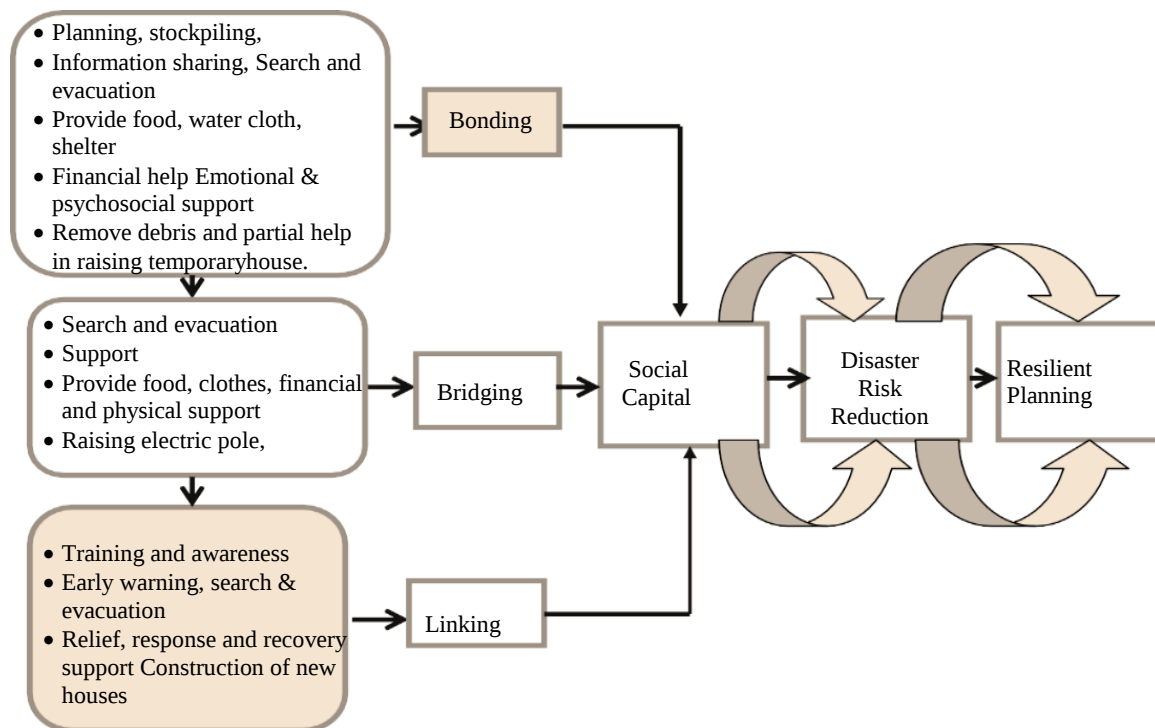


Figure 4: Contribution of bonding, bridging, linking capital in disaster risk reduction and resilience planning at a glance during cyclone FANI – 2019 , in Puri district of Odisha state

THE INDEX FRAMEWORK MODEL

Coming to measuring the resilience, an index to calculate is require to study the context and apply to similar contexts [23]. A tentative abstract index chart can be created .The framework can comprise the head of bonding ,bridging, linking social capital followed with the indicators and sub indicators ,derived from case study and secondary study. Further to make the model measurable, a quantitative quotient can be added to it.

One of the most accepted and convenient model in measuring resilience can be a parameter model guide where each indicator can be grouped and graded out of a number. This study constructs its five indices by acquiring several variables that describe different aspects of the concept, scaling them from 0 to 5, where 0 indicates weakest social capital or vulnerability and 5 indicates strongest, and combining these each into an index. This study mirrors Kyne and Aldrich's (2020) approach for its social capital indices and Cutter et al.'s (2003) approach for its social vulnerability index.

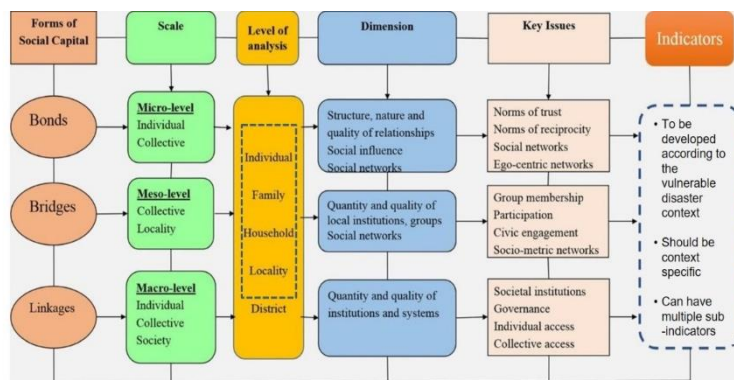


Figure 5. Proposed social capital framework can be adopted as per social, political, economic context of the disaster prone area.

The social capital indicator model (Figure 5) demonstrates the multilevel and multidimensional conceptualization of the nature of social capital. According to social capital goes from cognitive to structural, and from micro to macro, while reflecting multiple aspects as claimed by Stone (2001). It also extends from the individual to the collective to the social level, illustrating the concept's multilayered structure [24]. Such an approach will help in understanding how links, bridges, and linkages are utilized for improved availability and versatility to address urban vulnerabilities in a particular authentic, social, political, and financial setting.

Early findings indicate that, when suitably tailored to context, quantitative indicators can give insights into components of the social capital framework. The indicators of IDSUE (Indicator Development for Surveillance of Urban Emergencies) Data from the Nairobi study on bonding, bridging, and connecting capital (Gallaher CM, 2013) can act as a prototype to understand the index but further case studies are required to go in-depth studying all indicative and governing factors for creating a successful index quantification method.

MEASUREMENT WITH INDEX METHODS ON A QUANTITATIVE SCALE

The index Summarizes the findings and their implications for understanding measurable parameters of resilience based on social capital in the studied scenario. (Figure 6) The Index kit helps potential applications of the framework for decision-making, policy development, or further research.

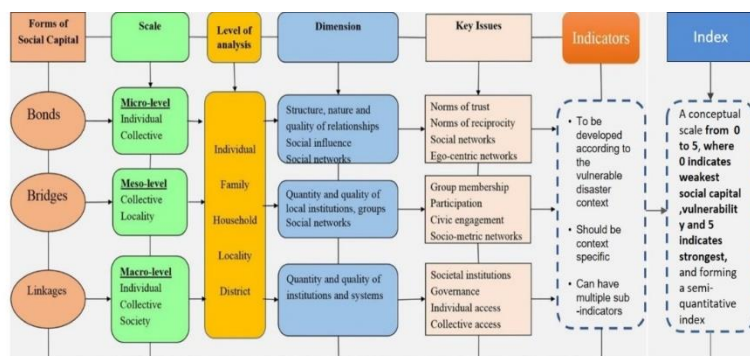


Figure 6. A measurable, semi –quantitative social capital framework with index grade to give a measurable picture to the scenario.

INFERENCE

The index study aids in identifying quantitative indicators that, when appropriately adapted to context, can offer insights into various aspects of the social capital framework. These markers are based on certain traits of holding, bridging, and connecting social capital point by point in (Tables 1, 2, and 3) over. Quantitative measures, however, are insufficient on their own to fully implement the social capital framework. It is important to look at ego-centric networks to assess social ties and people's perceptions of their relevance in risky situations. Such an evaluation necessitates the use of more interpretative methodology. We need to learn more about the ways that people interact with those who have power, wealth, and influence. Such investigation may take the shape of qualitative research and combined survey responses. The research has also served to emphasize the need for a comprehensive strategy, the use of a mixed methodologies approach, and the development of connections with important local players when examining social capital in vulnerable situations.

CONCLUSION

The key to comprehending the relevance of social contact for successful localization of humanitarian response in vulnerable environments knows social capital (bonding, bridging, and connecting capitals). Yet, it is important to comprehend what these capitals are and how they might be quantified in light of context-specific concerns and indicators. The features of the social capital idea have been developed and explained in this article, leading to the creation of a multilevel and multidimensional framework that should be modified for use in vulnerable situations. In instance, any setting in which social capital is to be quantified requires the adaptation of the indicators for measuring bonds, bridges, and connections. To further define the notion and demonstrate its applicability to humanitarian action, further most probable and least likely instances of social capital in humanitarian action—particularly in semi-urban or rural areas—should be researched.

Effective vulnerability reduction and capacity enhancement require government organizations to have adequate, realistic, and functional planning and coordination. The ability of all community members must be increased. This requires the assistance of some government and non-government groups as well as their involvement. Furthermore, there are additional aspects than social capital that govern how quickly and effectively disaster response and recovery activity is carried out.

1. The above study states that Odisha is at high risk of cyclones. If the Cyclone disaster is managed then the state will be 60 % more resistant.
2. Cyclone disaster management + community level management = 80% social resilience achieved in the state of Odisha
3. A model so designed for coastal areas in Odisha can be followed in similar areas of 8 coastal regions like Gujarat, Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and West Bengal.

Therefore a strong guideline needs to prepare and implemented as an integral part of the disaster master plan. Community leaders' collective activity, collaboration, and coordination made it feasible to carry out search, evacuation, relief, and response activities. Leaders must be periodically updated on managerial skills and guidelines in order to effectively coordinate the whole disaster management cycle and build the community's resilience to shocks and stressors in the aftermath of future catastrophes.

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