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Perceiving Resilience as Freedom: Experiences from Flood-prone Haor Settlements in Bangladesh

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Abstract:- This grounded theory research utilizes a method of facilitated inquiry to aid in unpacking underlying factors that contribute to acquiring perceptions of resilience amongst adults from two flood-affected settlements of the Haor region, Bangladesh. Inhabitants of this region accommodate themselves in isolated and constructed island-like settlements, threatened by unmitigated wave activities during floods. The focus group discussions led to identifying factors affecting perceived flood vulnerability and resilience, before prompting participants to vote on the relative significance of these factors.

The results are analyzed and interpreted in explaining communities' perceived resilience in a disaster context and resilience is communicated as the freedom of choice, which is desired to be achieved by eliminating identified factors of vulnerabilities as sources of 'unfreedom'. This research primarily contributes to existing theories by introducing the idea of 'Resilience as freedom' that will aid to understand the inner reason of community expectations.

I. INTRODUCTION

The global need of reducing disaster risks requires an understanding of perceptions of vulnerability and resilience of communities who accommodate themselves in natural hazard-prone locations. A disaster can be resulted from any hazard incident if a vulnerable community, due to its limited capacities, fails to cope with adverse conditions and cannot recover without external supports (Chowdhooree and Islam, 2018; Shaw et al, 2013). Community resilience is usually identified as the accumulation of shared tangible and intangible qualities, including experiences, skills, and knowledge that allows the community to deal with and recovery from disasters (Coles and Buckle, 2004), through allowing flexibility, changes, and adaptability (Wenger, 2017). Scholars (Chowdhooree, 2020; Chowdhooree, 2019; Schelfaut et al, 2011) have varied views for identifying properties or factors of community resilience that provides a niche to explore communities' perceptions about resilience. Through the compilation of translated individual sensory impressions of facts and events, based on long-lived experiences, communities perceive risk and resilience, accumulating such into a comprehensible and integrated view of their surrounding environment (Chowdhooree et al., 2018). This case-study-based grounded theory research aims to provide a nuanced understanding of community perceptions of resilience to guide more appropriate mitigation interventions. This paper reports on research carried out in two settlements of Bangladesh's Haor region to understand community perceptions of vulnerability and resilience.

II. LITERATURE REVIEW

A. Concepts of Community Resilience and Community Vulnerability

Community resilience and community vulnerability are two popular terms in the field of disaster study that is usually portrayed as the opposite of each other. According to Geis (2000), a disaster-resilient or disaster-resistant community as the safest possible community can be developed by minimizing its vulnerabilities in a natural hazard context. Any analysis, aiming to enhance resilience to disaster conditions, requires identifying entitlements, like, who are vulnerable, why they are vulnerable, and how vulnerabilities can be eliminated. Knowing why leads to finding out what to achieve or what to modify to enhance resilience. Sen (1984, 1981) argues to analyze causes as 'entitlements', means, details of available rights, and opportunities that allow a household to legally command or avail commodities. In the development context, Sen (1984) argues 'entitlement' as a freedom that allows to 'be' and 'do', to 'function' and to 'achieve' expected outcomes. Similarly, access theory, provides a broader empirical analysis of what people can avail and use through exploring abilities and capacities of people to benefit from things (Ribot and Peluso, 2003). Community resilience is also identified as a community's 'entitlements' or 'accessibility' to 'be' and 'do', to 'function', and to 'achieve' desirable outcomes (Watts and Bohle, 1993; Downing, 1991). It identifies a community's transformation from being victims (vulnerable) to resilient with abilities to change its own destiny (Wegner, 2017a).

Besides Sen (1984, 1980), other scholars have established causal chains for identifying entitlements. Blaikie (1985), in his household-based social model, proves how important it is to assess and value assets that help to cope with or adjust to natural adversities (hazards) so that a

community's lives, and livelihoods are not undermined. Berkes (2007), analyzing the socio-ecological system, finds four important factors that contribute to enhancing resilience in any natural hazard context: (1) learning to live with changes and uncertainties, (2) utilizing diversity in its various forms, (3) combining available of knowledge and skills, and (4) creating opportunities for self-organization and cross-scale linkages. This widened explanation provides a clear advantage on the operational ground.

Two types of views: the objectivist or risk-hazard view and the social constructivist view are popular for analyzing vulnerability (Cardona, 2012; O'Brien et al, 2007; Füssel and Klein, 2006) in the operational ground. Objectivist or risk-hazard view as the positivist or realist school, defines risk as a tangible consequence of occurring natural and social processes, which can be traced and measured using available knowledge and technology (Althaus, 2005; Jasanoff, 1999). Risks are also associated with the probability of losses due to impacts of hazards (Shefali, 2009). Based on traced and measured scenarios of the future, it asks to investigate the best direction for taking actions to respond to future climatic events and this approach leads to achieving a sustainable world (Ikeda, 2011). Here vulnerabilities are identified as a combined effect of both external and internal dimensions, where external dimensions are represented by the exposure to risks and internal dimensions are comprised of sensitivity and adaptive capacities against these risks (Füssel and Klein, 2006). On the other hand, the social-constructivist approach identifies a vulnerability in terms of capacities of a community and intends to build enough capacities to adapt, resist or rebound, leading toward the causal analysis, which asks to find out the socio-economic and socio-cultural causes of vulnerability (Cardona, 2012; O'Brien et al, 2007). A disaster risk, in this case, is defined as a socially produced phenomena, rooted in the social structure of the affected community (Lovekamp and Arlikatti, 2013; Quarantelli, 2005).

Both realist and social constructivist views explore operational ways of developing or enhancing community resilience without focusing on a community's own ideas, views or perceptions about risk or vulnerability and resilience. The current research intends to explore that niche.

B. Perceptions of Community Resilience

The routine active theory, proposed by Cohen and Felson (1979), identifies vulnerability as the predictable and repetitive regular activities or lifestyle patterns that are risky at the same time. Risky lifestyles, combined with possible incidents (like, natural hazards) and an absence of capable guardians make a community vulnerable to those incidents. On the other hand, the social learning theory (Akers, 1973; Sutherland, 1947) identifies behaviours as adopted results of reinforcement, imitation, and conditioning, where members of a particular group spread as well as promote certain behavioural patterns and practices that are learned and followed by others. Behaviours, which draw positive responses, are usually appreciated, and accepted by individuals and behaviours, drawing negative impacts are usually get rejected. These appreciated and acceptable behaviours can be recognized as resilience that allows to 'be' and 'do', to 'function' and to 'achieve' expected outcomes (Chowdhooree, 2020). Behaviours are guided by perceived reality and Schelfaut and his colleagues (2011) argue to know communities' risk perception through exploring their awareness of possible risks and possible consequences of their actions for enhancing community resilience.

For discovering the perception of community resilience, some authors (Kuhlicke, 2013; Luthar and Cichetti, 2000) prioritize the understanding and analysis of individual community members' behaviours and mindsets. As social as well as physical environments are central to the functioning of individuals, it is essential to know regularly experienced facts and events and everyday ecologies of an individual for designing any intervention to enhance resilience (Luthar and Cicchetti, 2000). The physical environment refers to the built environment that can be altered or modified based on the realist approach to vulnerability reduction. Every change in the built environment triggers a change in an individual's behaviour and collective changes of a group of individuals influence to change communal behaviours. Thus, resilience, achieved through behavioral changes can be identified as individual resilience and community resilience and these two types of resilience harmoniously serve to build a stronger community through providing support to individuals within it. Instead of analyzing actual behaviors before, during and after an incident, Kuhlicke (2013) proposes to inspect how community members establish or maintain connections among their experiences and the cumulative experiences result the resultant outcome. In this way, various factors, such as social, familial, and academic factors interactively and collectively develop resilience (Ainsworth, 1989). However, Graybill (2012) emphasizes to understanding the emotions of human beings for explaining the perception of resilience as emotions are also important parts of human experiences and they live through emotions within natural environments. According to Davidson and Bondi (2004), emotions, as intangible aspects of our regular nature, inform us how to feel, think and react within and to our environments. Experiential knowledge and emotions about a place can be considered as elements for perceiving any place (Casey, 2009) or environment that might be modified or altered due to uncertain events and several interventions. Thus, the perception of resilience is associated with the environment and especially its interactions with various tangible and intangible factors that also include emotions.

This research intends to provide a nuanced understanding of community resilience through exploring the complexity of community perceptions, especially in a context where changes in the surrounding environment have been imposed with an intention to mitigate flood-losses.

III. CONTEXT: THE HAOR REGION

The Haor region, located in the north-eastern part of Bangladesh is a tectonically depressed floodplain of the River Meghna and its tributaries (MoEF, 2005). Its natural landscape is like a mosaic of wetlands and seasonally

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inundated lands, that turns into a vast but shallow (1.8–3 m) water body during the annual flooding season (from June to September), due to monsoon floods and extreme flash floods (Salaudding and Islam, 2011; MoEF, 2005). The region is large, covering about 1.99 million hectares of area, 12% of which accommodates over 19.37 million people (MoWR, 2012) in densely populated, but isolated settlements (Alam and Hasan, 2010) (Figure 1) of 10 to 500 families (Field Survey, 2021).

Fig. 1: Typical Haor settlement (a) during the monsoon season (Roy, 2015) and (b) housing in the Concernpara settlement (Field survey, 2021)

The traditional way of building a settlement starts with artificially elevating the selected low land. The dredged soil is added to elevate the mound up to 3-4 meters high and dwelling units are built on top of it (Figure 2). The edges are usually protected with traditional fortifications, consisting actively rooting choila grass (Hemarthria compressa), bamboo poles, mats, reeds, sandbags, or bags of water hyacinth (Ichhornia crassipes) (Alam and Hasan, 2010). Still, the settlements are at high risk of get eroded, washed away or partially collapsed due to strong wave activities (Anik and Khan, 2012). In some cases, the settlements have received financial and technical supports from governmental and non-governmental organizations for protecting the edges with non-traditional infrastructures, i.e., brick walls and revetments.

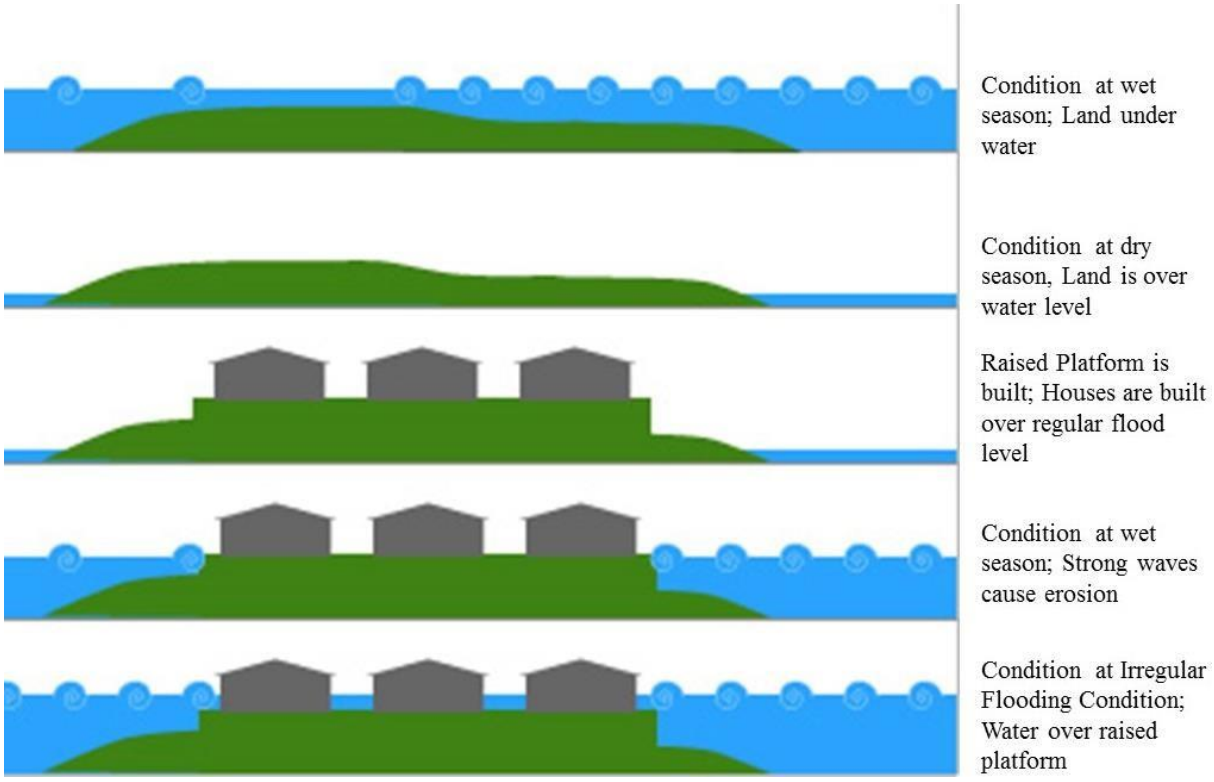

Fig. 2: Traditional process of building a typical Haor settlement (Field survey, 2016-2021)

IV. METHODOLOGY

The Haor region stretches over parts of seven districts of the north-eastern region of Bangladesh, including Kishoreganj (MoWR, 2012). Tow settlements (Concernpara and Nakusha-Dashkusha) from Itna sub-district of Kishoreganj District (Figure 3) are chosen, as these are representative in terms of flood-related vulnerabilities, faced by settlements.

This research presents selected parts of an on-going research that has been conducting since 2016. It employs the qualitative data collected from focus group discussions conducted in a participatory way. The discussions were followed by pair-wise[1] comparison analysis that allowed ranking the identified vulnerability and resilience factors. Participants were selected considering their location of houses, economic condition, and gender. Almost equal number of participants were selected from two distinctive locations: riverside and haor-side location of each settlement. 5.9 %, 21.5%, 43.6% and 29.1% inhabitants of this region are identified as respectively rich, middle class, poor and extremely poor (IFAD, 2011). This percentage was maintained while selecting participants from each settlement to form a well-represented sample composition.

[1] The pair-wise comparison asks participants to pick one between two items based on their relative significance. The comparison is the one with the most votes, and each win is worth 1 point. Each tie is worth½point.

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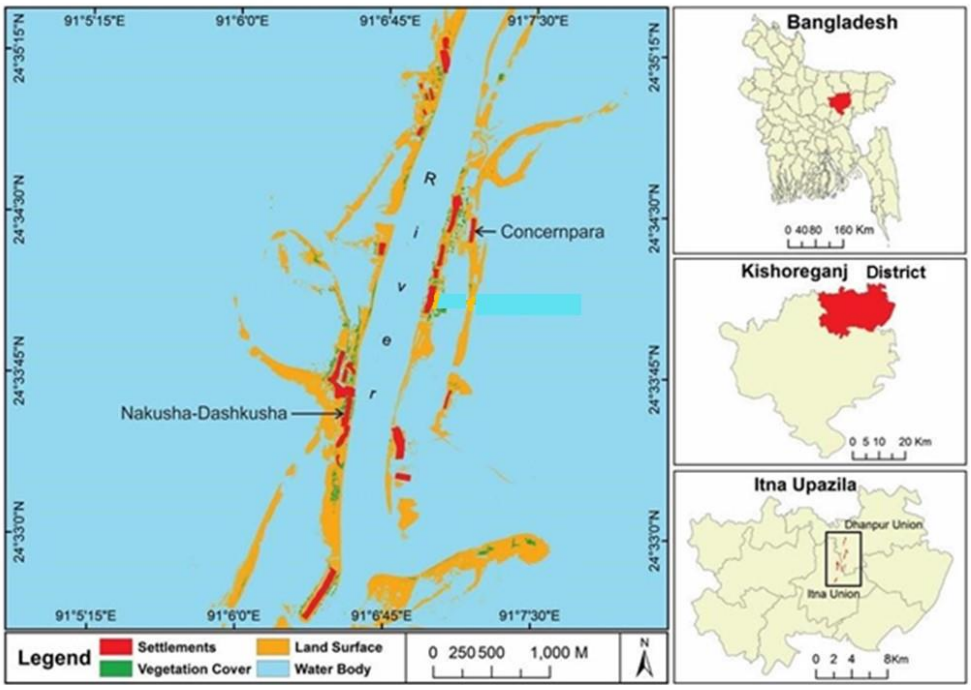

Fig. 3: GIS map showing the locations of three case study settlements based on satellite images from October 2014 (Apollo Mapping, 2014).

V. SETTLEMENT DEVELOPMENT PROFILE

A. Concernpara

The current land area (6007.03 m^2) of Concernpara (Figure 4) accommodates 230 to 240 families (Field survey 2021). It was established with financial and organisational support received from an NGO in 1990. After 5 years of establishment, the same NGO undertook a project to construct the concrete block revetment as a non-traditional protection infrastructure on its three edges, where erosion was most likely. However, the revetment construction was identified as faulty as it did not employ common methods of using wire cables or synthetic fibre ropes to join individual blocks and using geotextiles to allow drainage (CDoT, 2004). Over the period, the whole revetment was dismantled, and heavy concrete blocks were left behind. The inhabitants usually stack up those concrete blocks to form some sort of concrete block wall to try to protect vulnerable edges. These blocks are not only hard to handle and injurious to health, but the stacks may also even collapse anytime and make the settlement exposed to erode catastrophically.

B. Nakusha-Dashkusha

The current land area (8913.04 square meters) accommodates 240 to 250 families (Field survey, 2018) (Figure 4). This settlement can be identified as a combination of two islands, northern one is Nakusha and the southern one is Dashkusha. In a focus group discussion conducted in 2018, participants indicated that the southern part was built right after the great flood of 1988 as an extension of the existing northern part. In terms of getting assistance from NGOs for developing the built environment, in 1995/96, the settlement received free dredged soil from an NGO. However, its safety was dependent on traditional protection measures. It was communicated that NGOs have been working there since 1990 but it did not receive any external assistance for building any non-traditional protection infrastructure.

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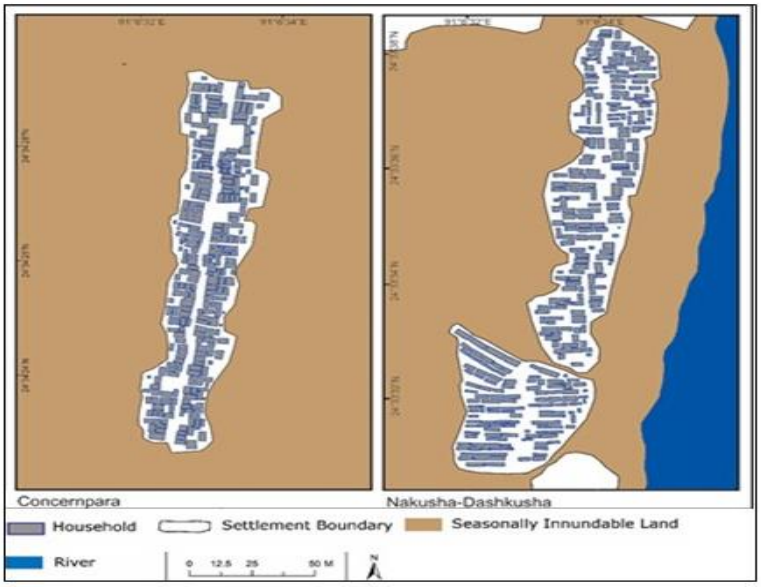

Fig. 4: Maps of two settlements (Field survey, 2016-2021)

VI. RESULTS

A. *Community Perceptions of Risk and Community Flood Resilience*

The participants from two settlements desired to get rid of the fear or threat of losing their lands/homes. They explained the resilient condition as the desired condition that allows them to deal with floods without being affected negatively.

Every year the inhabitants need to take care of their settlements, installing or reinstalling some sort of protection measures. The traditional protection measures, which include organic materials and sandbags, demand the financial as well as physical involvement of every household. Even knowing that these traditional measures have no or little contribution to protecting the settlements, inhabitants need to invest. Community members need to patrol the settlement area, especially its edges and protection measures, during flood events, looking for damages. If any damage is noticed, everyone (whoever can) needs to jump into the water with available materials to repair the damaged parts, regardless of the severity of the wave activity or time of day. The inhabitants cannot leave their settlements and go far for searching jobs/work, as they always need to be ready for repair. They must spend the whole monsoon period, which is almost half of the year, with the fear of losing houses and lands. For some, the fear becomes reality. The participants wished to get free from this added burden to their lives and want to function normally,which reflects the various things the community may value doing or being. As one participant of Nakusha-Dashkusha said,

We want to go out to work without thinking of the safety of our houses.

Fig. 5: Varying states of concrete block revetment walls around the Concernpara settlement. (Field survey, 2016 and 2021)

B. Identified Vulnerability Factors and Resilience Factors

In two different focus group discussions, the participants of two settlements identified factors for exacerbating vulnerability and enhancing resilience. These include natural threats, conditions of the built environment, communal capacities, and external supports.

a) Natural Threats

Though regular flooding was not considered as a problem, the participants consider unmitigated waves, which are often generated in vast waterbodies, as the main natural threat. The increased naval traffic has also exacerbated this natural problem. The isolated settlements, built over artificially raised grounds, are exposed to strong waves that may hit the raised ground and wash away dredged soils, potentially resulting in the catastrophic collapse of the settlement.

b) Conditions of Built Environment

The participants identified three features of the built environment as responsible factors for both exacerbating vulnerability and enhancing resilience. These are the location of the settlement, vegetation, and types of edge protection. Participants identified the proximity to neighboring settlements and distance from active river channels can make settlements safe. On the other hand, settlements, which are very isolated and/or close to multiple river channels, are prone to be damaged. Dense vegetation either planted or natural around a settlement helps significantly to save the settlement from erosion. The oral history passed down from the ancestors, provided the understanding that the regular haor settlements used to be surrounded by a natural forest of mango-pine (*Barringtonia acutangula*), *karaj* (*Pongamnia pinnata*) and similar kinds of plants which can survive in a waterlogged condition. The settlements were used to be built considering the presence of natural forest so that settlements could be quite protected by the dense natural forest. Gradually over the period through the process of massive deforestation, all surrounding lands went under crop cultivation, making the settlement exposed to strong waves.

Settlement edges need to be protected with some form of infrastructure or measure. Traditional measures are generally re-installed every year, anticipating the impacts of floods. Not only the traditional fencing but also some non-traditional infrastructures, like the concrete block revetment of Concernpara, were also identified as ineffective.

c) Communal Capacities

- **Financial Capability**

The participants expressed their expectations for suitable non-traditional engineered infrastructure for ensuring protection from flood-impacts as they have observed some successful interventions in neighboring settlements. However, it requires high financial investment, which they cannot afford. Financial investment is also required for reinstalling the traditional fencing, restoring the damaged part with dredged soil, and buying

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suitable lands for building new settlements. Their financial incapability contributes to exacerbating their flood vulnerability.

- **Construction Knowledge and Skill**
  The participants preferred to associate wave-related vulnerabilities with the physical weakness of the built environment (settlements), considering its condition of being prone to be damaged. The settlements are not built in such a way so that they can resist the wave forces. The edges of the settlements need to be protected with some forms of infrastructure or protection measures. Participants expressed their dissatisfaction with their limited knowledge and skills for building settlements in that condition.
- **Experience**
  Participants found them experienced with previous incidents, the impacts of those incidents, and their involvements in facing challenges. At the same time, the involvements of GOs and NGOs in their as well as their neighboring settlements also have made known the impacts of various measures.
- **Communal Unity and Disagreement**
  Participants usually found them very much united as a community that help them to make any important decisions and execute that. On the other hand, the absence of unity or capacity of taking communal decisions may put the settlement at risk. In one case, because of a decision of NGOs, the Nakusha-Dashkusha settlement failed to make a coherent decision. Nakusha-Dashkusha is a part of a bigger cluster of isolated settlements, where twice in recent history, NGOs asked to find out the most vulnerable settlement, more specifically its one or two edges, where they can assist to build non-traditional engineered infrastructure with their limited budget. It was hard for them to pick one or two settlements among the group as everyone wanted to get help for his/her settlement. As a result, the NGOs had to abandon that project.
- **Awareness**
  Participants valued their awareness regarding the time and nature of flooding, as well as its associated adversities. Inhabitants also got some training from NGOs on what to do during severe flooding conditions.
- **Interdependibility**
  Inhabitants are dependent on each other for protecting their settlement as well as ensuring their safety. As the settlement is built like a constructed island, every household who lives side by side needs to work together in a similar manner so that the vulnerable edges can be protected from being eroded away. This factor is identified as the feature of 'interdependibility' that works positively to unite them and build a community spirit to work coherently.
- **Local Leadership**
  Participants indicated that over the years due to getting involved with several NGO projects local people, especially the female members have achieved leadership quality, which has made them able to play roles to secure the community's interests and make decisions on behalf of the whole community. Community members also rely on them and feel confident working under their leadership. It has been identified as a positive factor for dealing with their needs as well as flood adversities.

d) External Support

- **External Finance**
  The participants identified NGOs as the source of external finance due to their involvement in the studied settlements as well as in the vicinity for running several projects. Concernpara was established and its concrete block revetment was installed with the financial support, received from an NGO. Participants from Nakusha Dashkusha settlement expect to get financial support from any NGO for building a suitable infrastructure to protect their settlement from flood adversities. In this way, participants identified external financing from NGOs as a vital factor in enhancing their flood resilience.
- **External Organisational Support**
  Participants identified that NGOs not only provide financial support but also provide organizational support. NGOs come with a plan for how to run the project, monitor its progress, and ensure the successful completion with the help of their employees. Though inhabitants are skilled to take traditional measures for protecting their settlements, they expect to have financial as well as organizational support from NGOs for building any effective infrastructure to protect their settlements. The participants of Concernpara even after experiencing the failure of the concrete block revetment expect to get financial as well as organizational support from NGOs for either fixing the revetment or building new infrastructure.
- **External Harmful Decisions**
  Participants found some of NGO's decisions/interventions have no/little impact on reducing flood vulnerabilities, and some of their decisions/interventions may act negatively on reducing vulnerabilities. The example of Concernpara fits into this category, where the concrete block revetment not only has failed to give protection but also added the risk of health injury and nullified the chance of getting further assistance for building a better protection infrastructure. The settlement of Nakusha-Dashkusha also has suffered because of the decision of NGOs, when NGOs asked the inhabitants to select a few settlements from a big group of settlements for getting assistance to build protection infrastructures. Their communal unity was disturbed because of this incident.

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Table 1 shows identified eight factors that exacerbate community flood vulnerability and twelve factors that enhance community flood resilience regarding their settlements, derived from focus group discussions.

Categories	**Vulnerability Factors**	**Resilience Factors**
Natural Threat	Unmitigated Wave Activities	--
Condition of Built Environment	Inappropriate Structure	Appropriate Structure
	Risky Location	Favourable Location
	--	Vegetation
Communal Capacities	Lack of Knowledge & Skill	Knowledge & Skill
	Communal Disagreement	Communal Unity
	Inexperience	Experience
	Financial Incapability	Self-financial capability
	--	Interdependibility
	--	Awareness
	--	Local leadership
External supports	External harmful decisions	--
	--	External finance
	--	External Organizational Support

Table 1: List of factors (Field Study, 2021)

C. Outcome of Pair-wise Comparison of Vulnerability Factors

The pair-wise comparisons of vulnerability factors were conducted across the settlements and table 2 shows individual scores of different factors for two settlements along with their average values. Figure 6 shows the radar diagram of those values.

Factors	Concernpara		Nakusha-Dashkusha		Average of scaled score
	Score	Scaled score=x/(n-1)	Score	Scaled score=x/(n-1)	
Inappropriate Structure	6.0	0.86	6.5	0.93	0.89
Risky Location	5.5	0.79	5.0	0.71	0.75
Limited Knowledge and skill	3.0	0.43	2.5	0.36	0.40
Communal Disagreement	0.0	0.00	3.0	0.43	0.22
Inexperience	4.0	0.57	2.5	0.36	0.47
Financial Incapability	4.5	0.64	4.0	0.57	0.59
External Harmful Decision	4.0	0.57	3.5	0.50	0.55
Unmitigated Wave Activities	1.0	0.14	1.0	0.14	0.14

Table 2: Scores vulnerability factors (Field Study, 2021)

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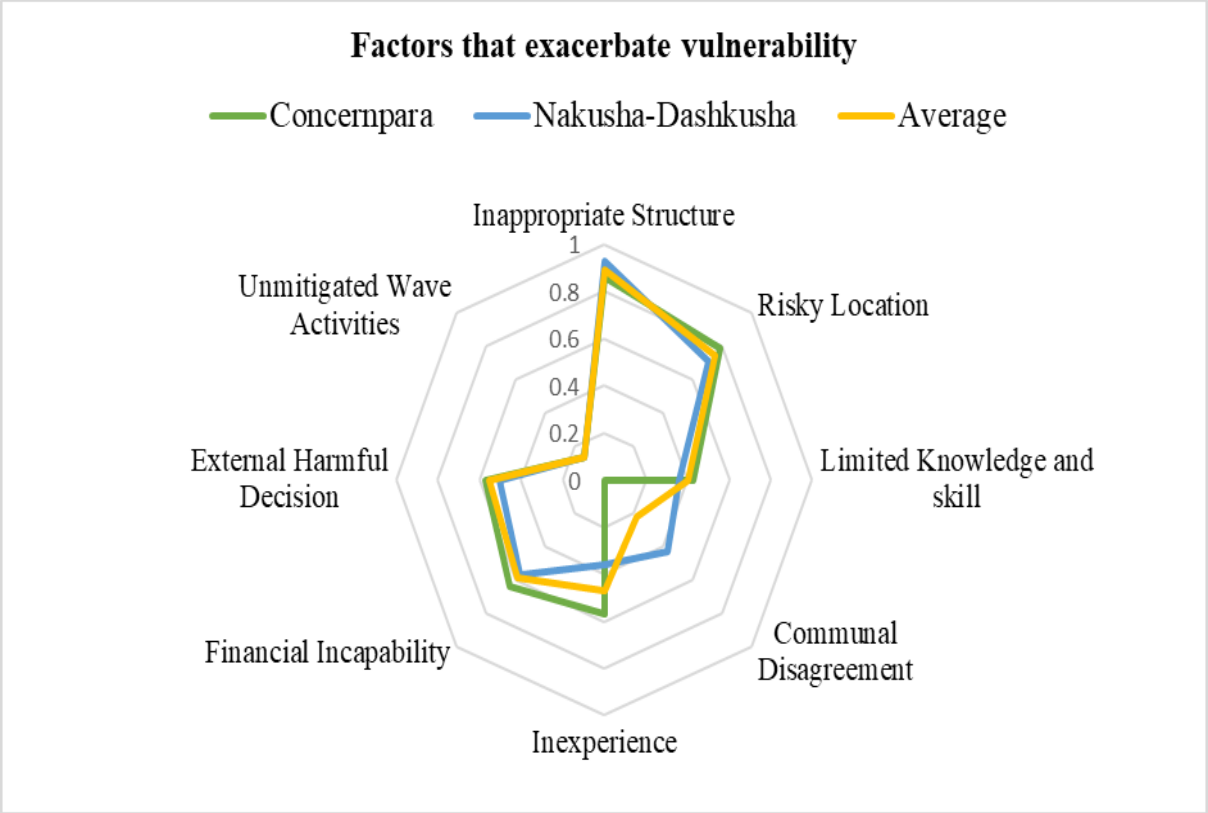

Fig. 6: Mean and individual values of vulnerability factors for two settlements (Field Study, 2021)

"Inappropriate structure" was identified as the most responsible factor for exacerbating vulnerability. "Inappropriate structure" as the structural flood mitigation measure was installed to ensure protection but fails to meet that expectation and it shows the communities' highest concern about the effectiveness of structural mitigation measures. The "risky location" factor and "financial incapability" are next in importance. The combination of these three factors conveys the representation of communities' perception about vulnerable built environment. For various constraints (which include financial constraints too), a settlement is constructed on a risky location, where the settlement could be protected through constructing an appropriate protection measure, which also usually demands higher financial investment.

The factor of 'community disintegration' has behaved differently mainly because of the experiences of Nakusha-Dashkusha community. The inhabitants of Nakusha-Dashkusha failed to take a united decision for selecting locations for constructing protection infrastructures and it suggested the participants of Nakusha-Dashkusha to give a higher score to 'community disintegration' factor in comparison with the score of the other settlement. Participants from both settlements marked the 'external harmful decision' factor as important. Vulnerabilities are principally perceived as the outcome of the inappropriate built environment, rather than merely as impacts of natural threats.

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D. Outcome of Pair-wise Comparison of Resilience Factors

Factors	Concernpara		Nakusha-Dashkusha		Average of scaled score
	Score	Scaled Score=x/(n-1)	Score	Scaled Score=x/(n-1)	
Appropriate Structure	10.5	0.95	9.5	0.86	0.91
Favourable Location	10	0.91	9.0	0.82	0.87
Knowledge & Skill	4.5	0.41	4.5	0.41	0.41
Communal Unity	2.5	0.23	3.0	0.27	0.25
Experience	3.0	0.27	1.5	0.14	0.21
Self-Financial Capacity	7.0	0.64	7.5	0.68	0.66
External Finance	9.0	0.82	9.0	0.82	0.82
External Organizational Support	8.5	0.77	9.0	0.82	0.80
Vegetation	6.0	0.55	7.0	0.64	0.60
Interdependibility	0.5	0.05	1.5	0.14	0.10
Awareness	2.5	0.23	2.5	0.23	0.23
Local Leadership	2.0	0.18	2.0	0.18	0.18

Table 3: Scores of resilience factors (Field study, 2021)

Table 3 shows the ranked list of factors for two settlements with the mean value for each factor. Figure 7 shows the radar diagram of the same information.

The ‘appropriate structure’ factor got the highest priority in the case of enhancing community flood resilience. The factors, which are next in importance, are ‘external finance’, ‘external organisational support’ and ‘favourable locations’. The combination of these four factors conveys the understanding that the communities prefer a built environment, which is built on a favourable location and protected with appropriate infrastructures, preferably built with external supports.

Though they did not choose self-financial capacity over external financial support, the community perceived that their financial independence would give them more choices. To achieve that financially solvent condition, the community needs external support for building a resilient built environment so that it does not need to spend on protection purposes.

The vegetation, as a part of the built environment, is identified as a mid-level factor for enhancing flood resilience, considering its contribution to countering wave energy. It is noticeable that communities did not find their own qualities, like ‘experience’, ‘awareness’, ‘interdependility’ or ‘communal unity’ as their strength. They take it for granted that all haor communities are aware of their conditions, are very united, helpful to each other and have life-long experiences, and these qualities are at the bottom of their list of factors for enhancing community flood resilience.

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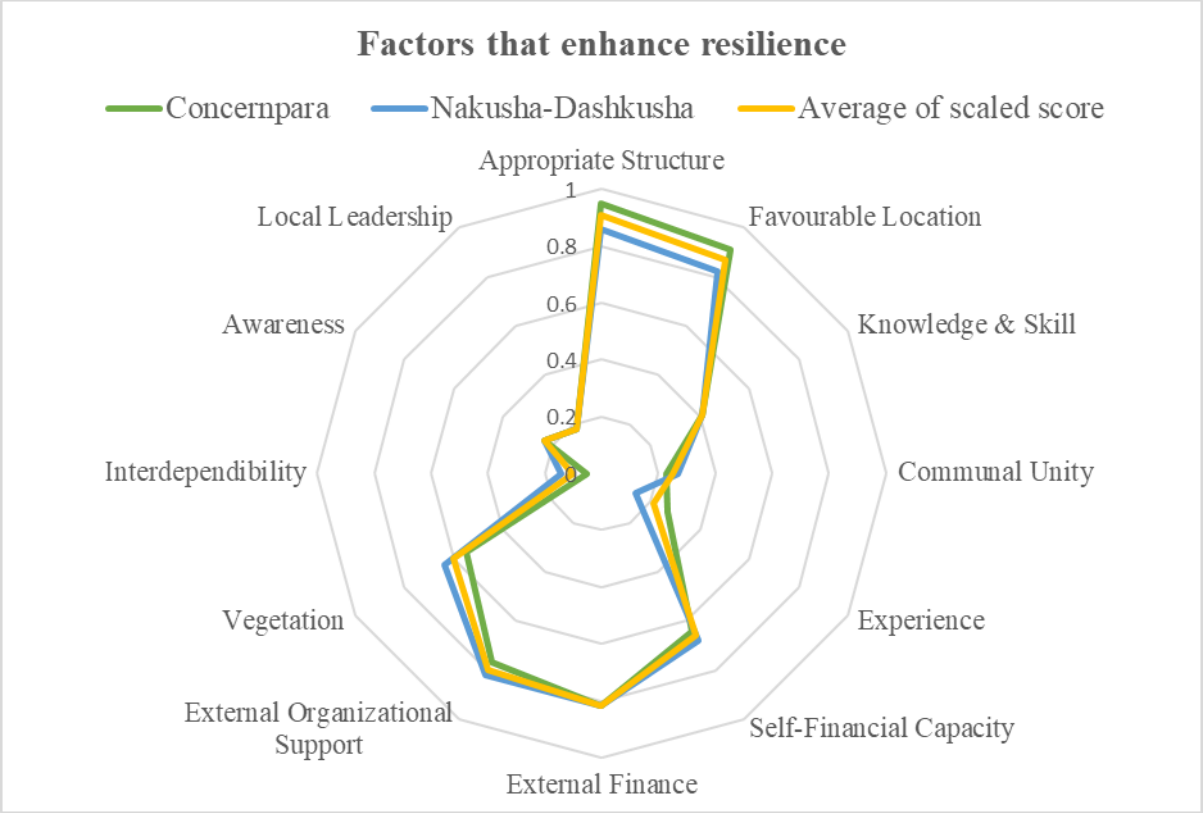

Fig. 7: Mean and individual values of resilience factors for two settlements (Field Study, 2021)

VII. DISCUSSION

Enhancing community resilience is communicated as removing sources of 'unfreedom' (vulnerability) that hinder the freedom of functioning. Communities consider 12 factors (Table 1), which have influences on allowing freedom of functioning that leads to community resilience. The 'functioning' reflects various things which the community may value doing or being and vulnerabilities hinder functioning with the desired level of freedom. They give priority to 'appropriate structure' (structural mitigation measures), as well as all those factors that are directly linked with the infrastructure-based development of the built environment. Even the factors, which are intangible in nature, like local leadership, communal unity, interdependibility, experience, or awareness, are chosen as resilience factors, considering their indirect contributions to the infrastructure-based development of the built environment.

Vulnerabilities are broadly perceived here as the deprivation of the right support, communal capabilities, and facilities, rather than merely as impacts of natural threats. The communities expressed their concerns about the limitations of the built environment due to risky location, scarce vegetation, and weak structures for protecting settlement edges. The limitation of construction knowledge and skill and financial capacity are also considered as vulnerability factors as these weaken the built environment even in a favorable location.

Sen (2005) in his book 'Development as Freedom', uses the term 'freedom' for describing choices, provided to the beneficiaries by development activities. Any development may allow expanding beneficiaries' freedom by removing sources of unfreedom, like poverty, lack of public facilities and services, or absence of political and civil liberties. Similarly, Goulet (1992) defines development as the mean that provides the vision of a better life with economic progress, amenities of improved quality, and ultimately, the array of means to achieve that vision. Thus, freedom is not only expected to acquire entitlements, rather it is expected to 'be' and 'do', to 'function', to attain necessary as well as preferable results (Sen, 1984). This freedom-centred perspective for explaining development has a generic resemblance with the common expectation of 'quality of life', based on the choices one has and the desire to expand choices. The haor communities' overall expectation primarily concentrated around development that would expand the choices for enjoying the desired level of quality of life. Similarly, Barret and Constas (2014) explain development as a condition that ensures individual's rights and meets aspirations for better living standards. In a disaster context, development is associated with adaptation, where development activities eventually result in adaptation through reducing or mitigating disaster risks and eliminating vulnerabilities, thus enhancing resilience (Chowdhooree and Islam, 2018; Cannon and Muller-Mahn, 2010). Though Sen's (2005) freedom-based view of development is criticized as highly romantic (Makuwira, 2006), this research found inspirations in it for understanding community perceptions about resilience. Enhancing community flood resilience is identified here as a process of expanding people's freedom in a context where infrastructure-based development acts like planned adaptation to flood damages.

Several scholars (Katyal and Petrisor, 2011; Meyer et al, 2012; Schanze et al, 2008) discussed their concerns about structural mitigation measures for ensuring protection from floods, because of their negative connotations on the environment and communities. However, the infrastructure is evidently not, what the haor communities are looking for. They primarily desire to have infrastructure-based development, preferably with external assistance, mainly targeting to enrich communal capacities that can be referred to as alternative combinations of functioning and performing. For example, the communities want to acquire financial ability that will allow them to invest wherever it will be necessary, without expecting any external assistance. On the other hand, the same community expresses their lack of confidence in having any infrastructure-based development without external organizational support.

If community capacities were expanded that will allow living the desired lifestyle which is not constrained by challenges; the freedom is actually the freedom of choices. It also supports the access theory (Ribot and Peluso, 2003) which aims to analyze what people can obtain and use by investigating the ability of people to benefit from things. According to the UNDP (1990), the development provides an enabling environment to its beneficiaries. When the reach of output and wealth is considered as only a means, the end of development must be beneficiary to human- beings; and development analysis and planning should focus on relating the means to the ultimate end (UNDP, 1990). Haor communities expect to have development, targeting to enhance the quality of lives they live.

It is very important to see freedom in a sufficiently broad way that can enrich community capacities. Freedom is desired to be achieved through the expansion of community capabilities to lead the kind of lives they value, and these matters should be central to the process of enhancing community resilience. In this way, the haor communities find freedom as not only the primary focus of community resilience, but also the principal means for enhancing resilience.

VIII. CONCLUSION

This research primarily contributes to existing theories by introducing the idea of 'Resilience as freedom'. It explains resilience-based theory on how community members perceive their environment and their resilience as an inner strength to intervene and interact with the surroundings. The perception of community flood resilience is not sufficiently investigated, since the perception is acquired through insight, knowledge, and experiences of humankind and the surrounding environment, including both natural and built, with their changed attributes, shape community perceptions. The haor communities have limited choices because of the presence of factors that exacerbate vulnerabilities on various scales. Each factor as a source of 'unfreedom' hinders the possibility to enjoy the desired level of freedom. This research found actions for enhancing community flood resilience as a process of expanding real freedom as both (i) the primary outcome and (ii) the principal means of achieving it. The 'freedom' as the primary outcome, relates to the achievement of practicing freedom through enjoying choices for enriching the lifestyle. The functional freedom includes elementary capabilities like being able to avoid such deprivation as the absence of an appropriate built environment. Development, in this view, is the process of escalating people's freedom, and the success of any development should be assessed with this consideration. The 'principle means of achieving freedom' owns the idea of the effectiveness of freedom as the pathway or process – not just as the end. Expansion of freedom must contribute to enhancing community resilience since community resilience itself is a process of enhancement of people's freedom in general.

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