CRITERION-REFERENCED ASSESSMENT INDEX FOR EVALUATING SOCIAL WELLBEING IN FLOOD RELIEF CAMPS

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ABSTRACT
The Sendai Framework for Disaster Risk Reduction advocates for reduction in disaster risk in the social assets of persons and communities. Well-being has been recognized by the World Health Organization as a significant determinant of health. Relief camps, being a vital community resource during the testing times of disaster, therefore, have a social obligation to enable expeditious recovery of displaced communities by offering social support. Despite the presence of numerous studies focusing on well-being in the built environment, very few explore social well-being in relief camps. The study aims to address this gap. The paper identifies social issues through mutual corroboration and interdependencies found by a mixed-review method involving three research approaches: comparative analyses of existing relief-camp guidelines, review of assessment reports of two prominent floods in India, and a structured interview of 255 inhabitants from 10 flood relief camps in the southern Indian state of Kerala. Recurrent issues were discerned from distinct sources, prompting the identification of assessment constructs and consequently, 50 assessment items falling under these constructs. The findings from this research can serve as an operative-index for evaluating social well-being in flood relief camps. The assessment index is fundamentally region-specific. However, the methodology employed may be adapted to develop similar indices. The originality of this research is in establishing the link between social well-being and relief-camps, and thereafter, formulating a method to assess social well-being in flood relief camps.
Keywords: social well-being, flooding, relief camp, resilience, community-centred, criterion-referenced assessment.

1 INTRODUCTION

Relief camps can play a significant role in developing psychological resilience of victims in the event of a disaster [1]. However, in the moment of urgency, all attention and resources are primarily focused on catering to critical physical requirements such as food, water and medical care. While those unquestionably remain the need of the hour, social well-being often gets compromised in the process due to uninformed decision-making at flood relief camps. The Sendai Framework for Disaster Risk Reduction 2015–2030 [2] advocates for reduction in disaster risk in the social assets of persons and communities. Even though social well-being is widely explored in the built-environment, it fails to have implications in relief camps, where it could play a vital role. The basic concepts relevant to this study are discussed in this section.

1.1 Background

Flood damage and resilience: The Inter-Governmental Panel on Climate Change (IPCC), in its *Fifth Assessment Report* predicts that "heavy precipitation events, which are very likely to increase in frequency in the future, will augment flood risk" [3]. In this context, studies

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exploring various aspects of urban flood resilience recommend cities and villages to amplify focus on enhancing resilience rather than resistance [4].

Relief camps: Used as temporary accommodation for a displaced group of people until they move back to permanent homes, relief camps gain significance following disasters. Subsequent to the rescue period of 72 hours, victims are accommodated in camps during the recovery and reconstruction period lasting up to a year. Relief camps are considered vital for personal safety, climate protection, security, and resistance to diseases [5].

Social well-being in the built environment: World Health Organization defines health as "a state of complete physical and mental well-being and not merely the absence of disease or infirmity" [6]. Well-being is established as one of the major determinants of personal health as per this revised definition. Disasters have a chronic effect on the physical and mental health of the affected population and hostile conditions could foster psychological trauma due to loss of family, property or livelihood. Mental stress manifest as bodily complaints, highlighting need for psychological support.

Community frameworks: The United Nation International Strategy for Disaster Reduction defines disaster as a serious disruption of the functioning of a community, causing widespread losses, which exceed its ability to subsist using its own resources. The community is of significance since it is often the group that shares space in relief camps in case of an unprecedented event [7].

Criterion-referenced assessment: Criterion is defined as "a property or characteristic by which the quality of something may be judged, but makes no statement or assumptions about actual quality" [8]. It differs from standards, which are about definite levels of performance. Generally, an assessment is "a representational technique" rather than a literal one. A construct, refers to concepts that cannot be directly observed, but may be evaluated through a collection of items. It is a particular body of content that an assessment is designed to measure [9].

1.2 Theory and research

Various academic articles were reviewed to form a concise framework of issues to be investigated. Several search terms such as resilience, psychological resilience, social well-being, family-resilience, vulnerable population and assessment criteria, were explored in this review. The information pertaining to the purpose and findings of this paper is summarized.

Folke et al., by exploring the social dimensions of disaster governance, define resilience as the capacity of a system to absorb disturbance and reorganize while undergoing change, so as to retain essentially the same function, structure, identity, and feedbacks [10].

Fletcher et al., in their study exploring the definitions of resilience in psychology literature, outline it as a positive adaption in response to adversities of varying nature, ranging from daily hassles to major life events. Psychological resilience to flood would therefore imply an individual's capacity to return to normalcy in life, both physically and mentally [11]. Jenkins and Meltzer [12] in their report on mental health impacts of the Indian Ocean Tsunami of 2004, explain that the survivors displayed symptoms of anxiety, depression and Post-Traumatic Stress Disorder (PTSD). Displaced victims reported the symptoms to a greater extent as compared to non-displaced victims. A study exploring the psychological impact of natural disasters states that, extended exposure to stress, as experienced in relief camps, can result in a complete breakdown of significant physiological processes [13].

Meadows et al. [14] in their research, identify associations between neighbourhood characteristics and health and well-being of residents. The study describes social well-being through theories in social cohesion and interaction. The theory is vital to a relief camp

environment since it functions similar to a close-knit neighbourhood. Three mechanisms linking neighbourhood, individual health and well-being are discussed.

1. Social cohesion: neighborhood's ability to create a sense of community among people.
2. Linking mechanism: physical environment, infrastructure and resources in the precinct.
3. Stress mechanism: neighborhoods with social disorder, few recreation options and limited access to healthy food builds the stress of living in the neighborhood.

Hackbarth et al. [15] underline the significance of assessing family resilience, as a building block of community resilience. Evacuating and keeping families together, providing them with appropriate shelter, support and mental health services are enlisted in Relief Camp Guidelines of India as interventions to help restore social cohesion and infrastructure [16]. These were found to be similar in principle to the three mechanisms discussed by Meadows et al. [14].

Maheen and Hoban [17] in their study concentrating on the plight of rural women in relief camps, emphasize the need to ensure social well-being of vulnerable population. Women were found to be more vulnerable than men in the same natural-disaster setting. Pre-existing gender inequality and socio-cultural community dynamics put women at greater risk. Pregnant women are particularly vulnerable because of their limited access to prenatal and obstetric care during disasters. The psychological effects of disaster are drastic among children, women and dependent elderly population [18].

The Guidelines for Assessment in Emergencies [19] provides a list of constructs for post-disaster assessment. The application of construct-item approach in existing disaster assessments is critical to this paper as the proposed index relies on the suitability of this framework. The framework suggests drawing assessment items to validate the enactment of policies relating to assessment constructs. Table 1 represents the assessment criteria and items prompted by the guidelines for this purpose.

Table 1: Assessment criteria based on *Guidelines for Assessment in Emergencies* [19].

Assessment constructs	Assessment items
Livelihood	Livestock; yield; tools and equipment; means of production of crafts, etc.; inputs for production (seeds, etc.); market access
Shelter and household	Essential everyday items; proximity and availability of services
Transportation	Access to transport services; access to places thru transport networks
Communication	Availability of communication resources (telephones, etc.)
Natural resources	Right to availability of usable water; energy availability; recreational spaces; pollution and hazard-free environment
Human capacities	Labour availability; skills; training
Financial means	Wages and salaries; self-employment; prices and rates; access to credit; access to savings; insurance

2 RESEARCH METHODOLOGY

Fig. 1 outlines the research methodology commencing from review of existing studies on relief camps and well-being to establish the research gap, and culminating at development of a comprehensive assessment index. The mechanism illustrated was employed to filter out issues affecting social well-being in relief camps through a series of steps.

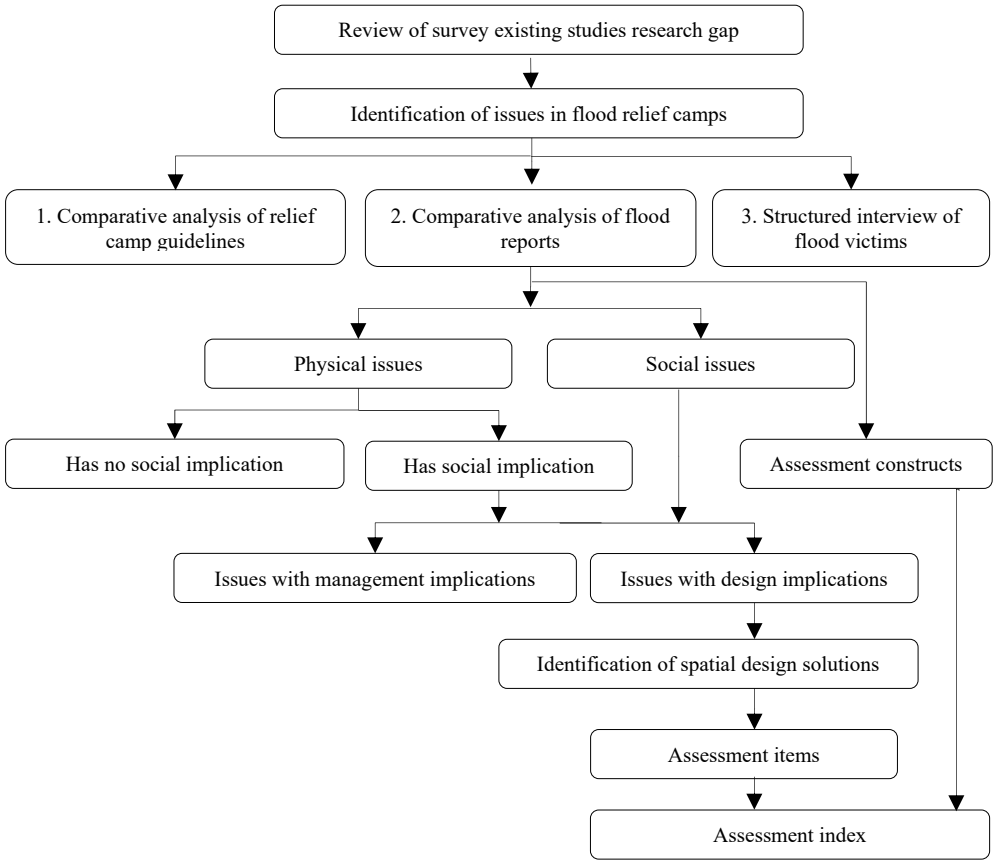


Figure 1: Research methodology.

Issues were identified primarily through three methods:

1. Comparative analyses of four relief camp guidelines of state, national and international scope (elaborated in Section 3).
2. Review of flood assessment reports of two prominent cases of floods in India; Kerala floods of 2018 [20] and Bihar floods of 2008 [21].
3. Structured interview of a focus group of 255 victims, sheltered in 10 relief camps, during the floods in Kerala in 2018.

The first two methods help outline the issues and identify constructs. The interview helps determine the weights associated with specific constructs based on regional factors and helps in customizing region-specific indices.

3 DATA COLLECTION AND ANALYSIS

For the preliminary identification of the issues and solutions, a comparative study of the following four relief camp guidelines of varying scopes was carried out to understand key requirements for well-being (Table 2):

1. Minimum Standards of Relief, Kerala [22] (KSDMA) and,

2. Guidelines for Relief Camp Management, Assam [23] (RDMD) for state-level guidelines;
3. Guidelines for Minimum Standards of Relief in Camps, India [16] (NDMA) for national-level guidelines;
4. Camp Planning Standards [24] (UNHCR) for international-level guidelines.

Table 2: Comparative study of existing relief camp guidelines.

		KSDMA	RDMD	NDMA	UNHCR
1	**Area/person (sqm)**	3.5	3.5–4.5	3.5	Cold/urban areas: 3.5; others: 4.5–5.5
2	**Special provision for diff.-abled, old, medically unfit**	✓	✓	✓	–
3	**Dairy products for mothers and children**	✓	–	✓	–
4	**Precautions against malnutrition**	✓	–	✓	–
5	**Special consideration for women**	✓	✓	Women police officers to be present for assistance	–
6	**Identification of vulnerable groups**	✓	✓	✓	–
7	**Provision of keeping domestic animals**	✓	–	–	–
8	**Provision of medical assistance**	Mobile medical teams	1 doctor and paramedic per camp	Mobile medical teams	1 health center per 20,000 people
9	**Psychological counselling**	✓	Families are to be housed together	–	–
10	**Help desks for grievances**	✓	✓	–	–
11	**Provision of communication devices**	–	✓	–	–
12	**Leisure/entertainment**	Toys and games for children	TV, newspapers, books, temp. schools	–	–
13	**Whether inhabitants are part of camp management**	Community kitchens	Camp management and security	–	–
14	**Livelihood support**	–	Awareness about NREGA[1], etc.; active SIRD[2] and DRDA[3]	–	–

[1]NREGA = National Rural Employment Guarantee Act; [2]SIRD = States Institute of Rural Development; [3]DRDA = District Rural Development Agencies; – no mention.

Despite extensive guidelines, relief camps face multiple issues upon post-disaster activation. Therefore, a comprehensive study of issues faced in flood relief camps from two distinct geographical and cultural contexts in India was carried out.

Table 3: Comparative study of flood assessment reports.

Construct	Kerala	U.P. and Bihar
Health	Spread of communicable diseases due to crowding; malnutrition in children; water-borne diseases	Medical teams deployed in relief camps with essential equipment
Gender	Fear of trafficking, teasing; women lack repair-skills	–
Education	Loss of study material, school days, school used as relief camp; school premises-suffered damages	Alternate learning spaces and study material provided in camps
Children	Violence and abuse; fear of return of floods and damage from shelter; need for mental support	Child psychological care and counselling support provided
Old and differently-abled	Difficulty in using washrooms, other services; access within building difficult; no special support; seeing, hearing, physical, mental health issues	–
Nutrition	Quantity of consumption of food remained unaffected after the floods; although food was contaminated	Nutritional supplements; special care of malnourished children
Water	Water borne diseases reported; reduced availability of potable water	Disinfection and regular testing of water to confirm potability
Social inclusion	–	Community kitchens; alternate learning; maternal health centres; *anganwadis* (preschools)
Sanitation	Lack of sanitary systems, open defecation reported	Family hygiene kits were provided
Shelter	Damage to houses – proportional to duration of stay at relief camp; legal property papers lost	Temporary shelters in camps with tarpaulin sheets
Mass awareness	–	Awareness for school dropout kids, their parents; mothers of malnourished children; hygiene drills
Livelihood	Harvests, cattle, cattle sheds lost; labour affected (due to outstation labour's return to respective home states); tourism, hospitality affected	–
Privacy	Lack of private bathing spaces and latrines. Separate spaces provided for families, lactating mothers; emergency rooms for pregnant women	Installation of temporary toilets and bathing cubicles

Joint Detailed Needs Assessment Report [20] cites the issues faced by relief camps in Kerala, a state in southern India, following the floods of 2018. Flood Emergency Response in Bihar and Uttar Pradesh [21] documents the details of the relief operations undertaken in the states Bihar and Uttar Pradesh in northern India during the overwhelming 2008 floods.

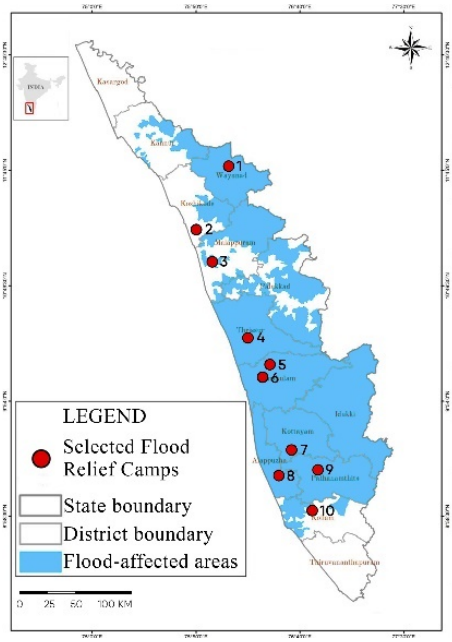
The former disaster being an unprecedented one, the state was underprepared and the report states the problems of inadequacy faced by relief camps. The latter being a recurring

event, was tackled proficiently, with the report highlighting their solution-oriented approach. The findings and observations from this comparative study are given in Table 3.

This comparative study, along with the study of camp guidelines helps find the multiple primary identifiers that can translate as assessment constructs to evaluate relief camps.

To gain a primary understanding of the weights of the issues falling under specific identifiers or constructs, structured interviews were conducted on a focus group of 255 flood victims from 10 selected flood relief camps in Kerala.

The selection criteria involved a minimum estimated capacities of over 500 individuals with an equitable representation from across the state in order to capture regions with varying severity of flooding as depicted in Fig. 2. Among these 10 camps, nine are academic institutions and one is town-hall. A close-ended questionnaire, binding on 20 constructs identified through studies and open-ended discussions with relief camp occupants was conducted as part of the interview. The questions were designed to cover the maximum scope of each construct. Each question was presented with a response scale denoting their satisfaction in each construct they represented, ranging from 1 to 10.



S.No.	Relief Camp	Capacity (in persons)
1	Govt. Higher Secondary School, Neervaram, Wayanad	600
2	Govt. Arts and Science College, Kozhikode	2500
3	Govt. Higher Secondary School, Tirurangadi, Malappuram	600
4	Govt. Higher Secondary School, Kodakara, Thrissur	1000
5	Govt. Higher Secondary School, Puliyanam, Ernakulam	1000
6	U.C College, Aluva, Ernakulam	1000
7	Town Hall, Changanassery, Kottayam	1600
8	Govt. Girls' High School, Haripad, Alappuzha	800
9	S.N.D.P High School, Edapariyaram, Pathanamthitta	700
10	Govt. Higher Secondary School, Puthur, Kollam	600

Figure 2: Selected flood relief camps in Kerala for primary data collection.

Various guidelines recommend culture-specific diet and clothing for the relief camp inhabitants. The regional factors, thus, needs to be identified and used to guide the development of assessment index. The questionnaire identifies the strengths and weaknesses of each construct and can help determine the weights to be assigned to the respective constructs for specific regional cases.

4 FINDINGS AND DISCUSSION

Based on the data, two measures of central tendency were calculated for each construct as depicted in Table 4 and Fig. 3.

Table 4: Percentage distribution of responses received from inhabitants of the ten selected flood relief camps (relative occurrences of modal values marked in bold).

Code	Percentage distribution of response (%)									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
HEA-01	0.4	1.6	15.3	20.4	**20.8**	18.4	18.4	2.4	1.6	0.8
GEN-02	0.8	17.6	18.8	**20.4**	18.8	18.4	3.9	0.4	0.4	0.4
PRI-03	0.4	20.0	20.8	**22.0**	20.0	13.7	1.2	0.8	0.8	0.4
EDU-04	0.8	15.7	15.7	17.6	**23.9**	7.1	6.7	6.7	5.1	0.8
CHI-05	0.4	1.6	3.1	22.7	**26.3**	22.7	21.6	0.8	0.4	0.4
ODA-06	8.6	20.4	**23.5**	22.7	21.6	1.2	0.4	0.8	0.4	0.4
VUG-07	0.4	24.7	23.9	**26.3**	22.4	0.4	0.8	0.4	0.4	0.4
NUT-08	0.8	0.4	0.4	1.6	31.0	**33.3**	30.2	0.4	0.8	1.2
WAT-09	0.4	0.4	1.2	0.8	25.1	**26.7**	24.3	19.6	0.4	1.2
SHE-10	0.4	0.4	22.4	23.1	**25.1**	16.1	11.4	0.4	0.4	0.4
SAF-11	20.4	24.7	**25.9**	24.3	1.2	0.4	0.4	0.8	1.2	0.8
SEC-12	0.8	23.5	24.7	**25.1**	23.5	0.4	0.8	0.4	0.4	0.4
HES-13	0.4	29.4	**30.2**	24.7	12.2	0.8	0.4	0.8	0.4	0.8
SIN-14	0.4	0.8	0.4	0.8	24.3	**25.5**	24.7	22.4	0.4	0.4
LIV-15	0.8	19.6	19.2	**20.8**	18.4	19.6	0.4	0.4	0.4	0.4
TRA-16	0.8	0.4	0.4	0.4	22.7	**28.2**	23.5	22.7	0.4	0.4
COM-17	0.4	0.8	0.4	0.8	4.3	8.6	**30.6**	26.7	25.5	2.0
MAW-18	0.4	0.4	0.4	0.8	23.9	**25.1**	23.1	24.3	1.2	0.4
LEI-19	0.4	0.8	20.4	23.5	**25.5**	13.7	14.1	0.8	0.4	0.4
LST-20	1.2	25.1	30.2	**31.0**	4.3	3.1	2.0	2.0	0.4	0.4

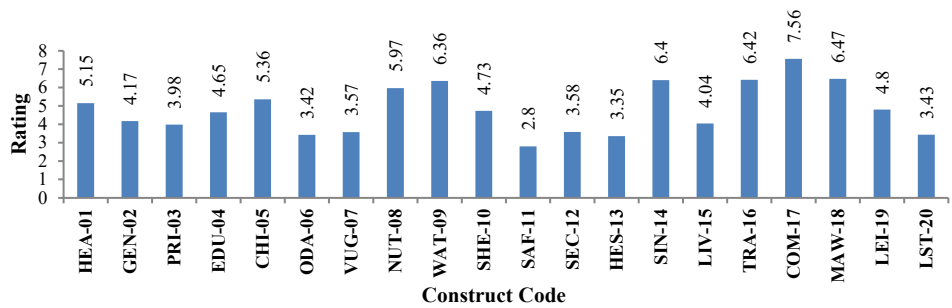


Figure 3: Graphical representation of mean ratings given by the inhabitants of 10 selected flood relief camps on the 20 indicators.

a. Health *(Mean: 5.15, Mode: 5):* Communicable diseases, water-borne diseases and malnutrition were serious issues in relief camps. Proper physical distancing and provision of clean flood and water need to be ensured.
b. Gender *(Mean: 4.17, Mode: 4):* Lack of gender segregation, especially in the event of being unaccompanied by family, and fear of teasing created a hostile environment for girls. Separate toilets for females, although recommended, were not provided in all cases.

c. Privacy *(Mean: 3.98, Mode: 4):* Privacy was compromised in most relief camps due to overpopulation. Lack of private bathing spaces and latrine were critical issues. Families could not have private spaces as recommended, due to lack of partitions and enclosures.
d. Education (Mean: 4.65, Mode: 5): Education was affected for both the inhabitants and the regular students at the schools and colleges operating as relief camps. Alternate learning spaces were necessary, and access to these spaces needed to be ensured.
e. Children *(Mean: 5.36, Mode: 5):* Children underwent psychological trauma caused by fear of return of floods. Shutting down of schools and adversely affected their life patterns. Transforming the relief camp premises through wall paintings is recommended. Protection from abuse through passive surveillance can be ensured in planning.
f. Old and Differently-Abled *(Mean: 3.42, Mode: 3):* Although most of the camps had differently-abled-friendly fixtures, inadequate access and lack of help led to mental stress over helplessness in the elderly and differently-abled. Vision and hearing impairments was common in the elderly, causing them difficulties in habituating to a new environment.
g. Other Vulnerable Groups *(Mean: 3.57, Mode: 4):* Lack of sufficient care, privacy, nutritional diet and medical care creates a hostile environment for pregnant women, lactating mothers, patients or malnourished people. Unsanitary conditions caused risk of spread of diseases to infants.
h. Nutrition *(Mean: 5.97, Mode: 6):* Primary survey showed that most inhabitants were satisfied with the food provided in relief camps. Though, in some cases, food was reported to be contaminated by floods due to improper storage environment. Dry storage areas are a necessity during floods.
i. Water *(Mean: 6.36, Mode: 6*): Supply of clean water was an issue due to contamination of water sources. Stagnation of water in the premises led to spread of diseases. Clean water storage facilities are a necessity. Also, the water points need to be accessible for the differently-abled and elderly.
j. Shelter *(Mean: 4.73, Mode: 5):* Lack of a shelter to return to lengthens the stay of victims in relief camps. Temporary shelter arrangements were made to help the inhabitants gradually relocate away from the relief camp buildings. Alternately, temporary shelters served as classrooms. The quality of life in these makeshift structures needs to be assessed.
k. Security *(Mean: 2.80, Mode: 3*): Loss of belongings caused by absence of storage spaces for valuables such as cash, documents and jewelry are a matter of concern. Relief camps without adequate number of vaults or depositories spread discomfort due to fear of theft and loss of valuables among the residents, who have already suffered from loss of property and livelihood in floods.
l. Safety *(Mean: 3.58, Mode: 4):* Safety, in this context refers to human safety. Two priority areas here are safety for women and children which are already covered. Safety breach occurs when vulnerable groups find it difficult to thrive in an environment. A majority of the inhabitants felt unsafe as per the primary survey.
m. Hygiene and Sanitation *(Mean: 3.35, Mode: 3):* Lack of hygienic living conditions, due to moisture on surfaces, overcrowding, poor waste management and intermingling of sick and the healthy was reported. Latrine facilities were in shortage due to which residents had to engage in open defecation in many areas. Primary survey suggests that a majority of inhabitants found the camp unhygienic and faced issues. Lack of ownership and accountability among the inhabitants has contributed to contamination of precincts.
n. Social Inclusion *(Mean: 6.40, Mode: 6):* It is important to make the inhabitants comfortable in the social environment. Isolated cases of caste-based discrimination were

reported from Kerala as per the JDNA report. Initiatives such as community kitchen (engaging women and children), alternate learning systems, with volunteers for schools, maternal health centers and preschool restoration were certain interventions practiced in relief camps that has helped build an inclusive environment.

o. Livelihood *(Mean: 4.04, Mode: 4):* Livelihood destruction is a primary contributor to mental agony among victims. Congregation spaces in relief camps can be used to deliver awareness regarding welfare schemes and employment opportunities. Space can be assigned for skill training to help generate self-employment. Women could use this opportunity to initiate self-help groups to support families and bolster the economy. Very few camp inhabitants had income generation during their stay in relief camps.
p. Transportation *(Mean: 6.42, Mode: 6):* Access to relief camps is a necessity. Disruption of transportation results in mental stress among victims. It is crucial to have access to transport and to places on transport network.
q. Communication *(Mean: 7.56, Mode: 7):* Having functional channels for communication is critical during floods. Emergency situations can erupt and helplines need to be set up. Since phone lines could be damaged, alternate methods need to be looked for. Provision of phone-charging points is important.
r. Mass Awareness *(Mean: 6.47, Mode: 6):* At multiple occasions, when people need to be addressed at large about issues like hygiene, livelihood, malnourishment, education, etc., a public-address system, and/or a gathering space for announcements is necessary.
s. Leisure *(Mean: 4.80, Mode: 5):* Leisure activities suitable for all age groups should be organized as they play a critical role in reviving emotional well-being. Kids need a safe and open area to play. Spaces designated for television and radio promote public engagement. Community gathering spaces have been used for celebrating events.
t. Livestock *(Mean: 3.43, Mode: 4):* Livestock, albeit suffering habitat loss and trauma similar to humans, is often overlooked in relief camps. Only few of the rural relief camps equipped with space for livestock, which is important to the rural population.

The discourse on assessment constructs and factors affecting each, points towards assessment items. The assessment items, here, refer to the possible spatial implications that could satisfy the issues mentioned under each construct. Table 5 identifies 50 assessment items, identified from multiple sources, enumerated under the 20 constructs, which together present an index for assessing social well-being in flood relief camps. The assessment items mentioned against the corresponding constructs, are inferred from the relief camp guidelines and flood reports, and address the vital issues undermining social well-being, identified through the mixed-review of reports and questionnaires. Together, they put forth an all-encompassing compilation of proposals to be enacted in relief camps that could significantly ensure social well-being of its residents. Conversely, relief camps could be assessed on the basis of the given attributes to verify their relief standards on the basis of social well-being.

5 CONCLUSION

Indifference towards social well-being, a significant determinant of personal health as per the World Health Organization, impedes the post-traumatic recovery of the victims, and proves detrimental to their health and overall resilience of the community. The need for a criterion-referenced assessment index to evaluate social well-being in flood relief camps was thus established and substantiated with shortcomings observed in mixed-review of relief camp guidelines and flood assessment reports.

Table 5: Index of assessment constructs and corresponding assessment items.

Assessment construct	Solution references		Spatial implications/Assessment item
Health	NDMA Guidelines	1	Light and ventilation
		2	Secluded area for the sick
		3	Heaters to counter dampness caused by floods
		4	Dedicated spaces for medical teams, equipment, medicine
Gender	NDMA Guidelines	5	Partitions for gender segregation in living area
		6	Separate toilets for male and female
Privacy	KSDMA Guidelines	7	Segregation of spaces for families/ individuals
		8	Private bathing spaces
		9	Private latrine facility
Education	NDMA Guidelines	10	Provision of space for informal classes
		11	Safe access to nearby school
Children	JDNA Report, Kerala Flood 2018	12	Wall paintings to make camp child-friendly
		13	Enclosure to protect children
		14	Play areas with public surveillance
Old and differently-abled	NDMA Guidelines	15	Universal access to relief camp building
		16	Universal access to toilets
		17	Well-lit access to toilets at all times
Other vulnerable groups	NDMA Guidelines	18	Emergency room for pregnant women
		19	Private room for lactating mothers
Nutrition	UNICEF Report, 2008	20	Cool, dry kitchen and storage space for food supplies
Water	JDNA Report, Kerala Flood 2018	21	Universal access to water points
		22	No stagnation is to be ensured
Shelter	JDNA Report, Kerala Flood 2018	23	Shelter provision for long duration of stay
		24	Sleeping area segregated from activities spaces
		25	Personal spaces of comfort for each family/ individual
Security	KSDMA	26	Lockable doors and windows
		27	Provision for storing valuables
Safety	NDMA Guidelines, Red Cross Guidelines	28	Safe living condition of residents
		29	Well-lit circulation spaces
		30	Female police officers in the camp
Hygiene and sanitation	JDNA Report, Kerala Flood 2018 KSDMA Guidelines	31	Cleaning of toilets at regular intervals
		32	Clearing of debris at the earliest
		33	Dustbins placed all across the camp
		34	Space for storage of waste until collection

Table 5: Continued.

Assessment construct	Solution references		Spatial implications/Assessment item
Social inclusion	KSDMA Guidelines	35	Inclusive arrangement of inhabitants' living spaces
		36	Alternate *anganwadis* (preschool facility)
		37	Community kitchens
Livelihood	KSDMA Guidelines	38	Provision of space for workshops
		39	Designated space for awareness programs
Transportation	Red Cross Guidelines	40	Functioning access path to relief camp
		41	Parking space for rescue vehicle/ ambulance
		42	Gate of the camp enabling movement of lar vehicles/boats
Communication	NDMA Guidelines	43	Provision of communication devices, newspapers, radios
		44	Provision of charging points for cellular phones
		45	Designated desk for reporting grievances and complaints
Mass awareness	KSDMA Guidelines	46	Provision of a gathering space for public address
		47	Public announcement equipment like speakers
Leisure	KSDMA Guidelines	48	Provision of common areas for community gatherings
Livestock	KSDMA Guidelines	49	Allocated space for livestock
		50	Storage of water, food and shelter for pets, livestock

General theories on social well-being were explored and direct parallels were found between well-being mechanisms and the inadequacies reported in flood relief camps. Construct-item approach of criterion-referenced assessment structure was adopted as a reliable gauge as it presents an operative index to evaluate social well-being in relief camps.

The research, based on comparative analyses of the mentioned sources, helped gain perspective about the current gaps at achieving social well-being. It further led to the identification of assessment constructs and corresponding issues. Close-ended survey of relief camp inhabitants revealed lack of well-being in the relief camps and further emphasized the role of regional factors in achieving it. Furthermore, the rating scale employed proved to be an effective mechanism to determine the weights of each construct.

The issues and the corresponding spatial recommendations were identified and translated as assessment items. The study concluded with the enumeration of 50 assessment items under 20 constructs. Unlike the assessment index, which is region-specific due to inherent cultural biases, the method is universally applicable. The output of this research can serve as an operative index of assessment criteria to ensure effectiveness in spatial design solutions to ensure social well-being in flood relief camps.

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