Perceived Disaster Risk and School Resilience

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Abstract

This study was commissioned to analyse the "perceived risk and disaster/emergency and resilience" of schools in South Goa district of Goa and Thane district of Maharashtra. Adopting convenient sampling method 360 schools are covered under this study. Study found more than one third of the respondents perceived fire as immediate risk for their school. Nearly one fourth of the schools experienced disasters in past five years. One third of the respondents perceived that earthquake as greater risk to their school but only one fourth of the schools are having earthquake preparedness plan for resilience. Half the schools only conduct safety drills that too rarely. Most of the teachers and students are aware on do's and don'ts on various disasters. It is found there is a significant association between location of school, number of students,percent of students with disability, greater risk of schools and school resilience.

Keywords: *School Safety, Home to Safety, Perceived Risk, School Resilience*

1. Introduction

Experience of past disasters/emergencies and risk perception has a great impact on preparedness. Awareness of and preparedness for disasters and emergencies are essential for improved risk management. In recent past, schools in India and worldwide have witnessed many disasters/emergencies exposing vulnerability of children from the predictable and/or perceived risk. Schools are the daily refuge for millions of children around the world. By in large, school-age children spend between 6 to 8 hours on educational campuses roughly 5 days per week. During such time, a child's safety and security are transferred from the parents or guardians into the responsibility of the respective Heads of Schools and subsequent teachers and staff.

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In light of such responsibility transfer, the importance of a child's safety in the schoolhouse has long been recognized from both a structural and health-related focus (Veselak, 2001; Haynes, 2002; Salisbury et al., 2002; Deschesnes et al., 2003; Sheetz, 2003) as various natural and human-induced hazards pose risks to the lives, health and safety of students and staff at school (Berkowitz et al, 2002). Over the last century, the possibility of a mass-casualty event occurring on school premises has garnered widespread recognition (Graham, 2006). Whereby more recent high profile events such as the Beslan Terrorist Siege in Republic of North Ossetia, Russia, in September 2004 (Hickok, 2004) and the Columbine shootings in April 1999 (Larkin, 2009) as well as the numerous school shootings taking place around the globe (Infoplease.com, 2018), global attention has focused onto the need for emergency preparedness in schools. It is evident that in the face of such risks, schools need to be prepared to manage emergency events in order to prevent or minimize physical and psychological trauma to both students and staff as well as the surrounding community.

A brief glimpse into the recent past shows that schools in India have witnessed a plethora of disasters at all scales. During the 2001 Bhuj Earthquake in Gujarat, a total of 31 teachers and 971 students perished, and the injured counted 95 and 1,051 respectively (Roy et al., 2002; Kenny, 2009). Had it not been for a holiday, school-related deaths would have likely been in the tens of thousands for the near 15.7 million affected (Edinger, 2001). The widespread damage to physical infrastructure, totaling over $7.5 billion, disrupted formal education. Just four years later in October 2005, a far more devastating earthquake took place in Jammu & Kashmir leaving 19,000 children dead, according to Government figures, as a result of widespread collapsing of school buildings (Shiwaku et al.; 2007; Peek, 2008; Wachtendorf et al, 2008). One of the largest school-related disasters in Indian history occurred on July 16, 2004, in the town of Kumbakonam in the state of Tamil Nadu. In a building located between two residential buildings, three different schools were operating: the Sri Krishna Aided Private School, Saraswathy Nursery and Primary School, and Sri Krishna Girls High School. These three schools contained more than 800 students within one three-story building. When the fire initiated, teachers asked children to stay in a classroom, locked the door, and left to extinguish the fire. The fire escalated out of control and the 125 elementary children in the locked classroom were forgotten in the ensuing evacuation (Satapathy& Walia, 2006). A Fire breaks out in a private school in Thane West District of Maharashtra. However, no one was injured in the accident. Similarly many incidents occurred in Thane and Mumbai.

2. Methodology

The objective of this research is to obtain a baseline assessment of "perceived risk and disaster/emergency preparedness for school resilience ". It also focused on discovering the variables are associated with the preparedness for resilience of any given school. Factors associated with preparedness include location of schools, type of schools, students with disability, greater risk of schools. The study was commissioned in 2019.

The study was conducted in South Goa district of Goa and Thane district of Maharashtra. About 180 schools in each state were selected based on convenient sampling method and the total sample size is 360 schools. User friendly questionnaire was prepared and the data collected from School head masters/mistress through google form. Area wise schools covered under this study are given in Table 1.

Table 1: Area Wise No. of Schools

Location	Goa	Maharashtra	Total
Rural	130	116	246
	72.0%	64.0%	69.0%
Semi Urban	4	8	12
	2.0%	5.0%	3.0%
Urban	46	56	102
	26.0%	31.0%	28.0%
Total	180	180	360
	100.0%	100.0%	100.0%

3. Results and Discussion

The study found that among the surveyed schools, majority (29 percent) of the schools are having 101- 300 students followed by that more than one fourth (26 percent) of the schools are having 501-1000 students. Another one fifth of the schools are having 301-500 students. Only eight percent of the schools are having less than 100 students. About 16 percent of the schools are having more than 1000 students. The table is evident that more than 40 percent of the schools are having above 500 students. Among the surveyed schools majority (93 percent) of schools are coeducation and only three percent of the schools are for boys and four percent of the schools are only for girls.

Majority (62 percent) of the schools covered under this study are government aided schools and 29 percent of schools are only government schools. About nine percent of the schools covered under this study are private school. Among the schools covered under this study, More than two third (67 percent) of the schools are high schools. About 18 percent of the schools are higher secondary schools. Only three percent of the schools are primary schools (Table 2).

Table 2: Student's Classification

No. of Students	Frequency	Percent
101-300	106	29.0
301-500	76	21.0
501-1000	92	26.0
Less than 100	30	8.0
More than 1000	56	16.0
Total	360	100.0

3.1 Student's Classification

One third of the schools are having above 25 teachers and nearly one third (32 percent) of the schools are having 10-15 teachers. About 20 percent of the schools are having 16-20 teachers. About seven percent of the schools are having 21-25 teachers. Only eight percent of the schools are having less than 10 teachers. Majority of the schools are having good number of teachers. More than one third (46 percent) of the teachers average age is 30-40 years which is evident that the middle aged teachers can protect the students from any disasters. Only three percent of the teacher's average age is more than 50 years who can't save the students and they may need help from others to save themselves.

3.2 Students with Disability

The study found that more than one third (34 percent) of the schools are not having any disabled students. More than half of the schools are having 1-5 percent disabled

students and about two percent of the schools are having above 10 percent disabled students. About 66 percent of the schools having disabled students are required to give special focus on disabled students at the time of disaster or emergency for their resilience (Figure 1).

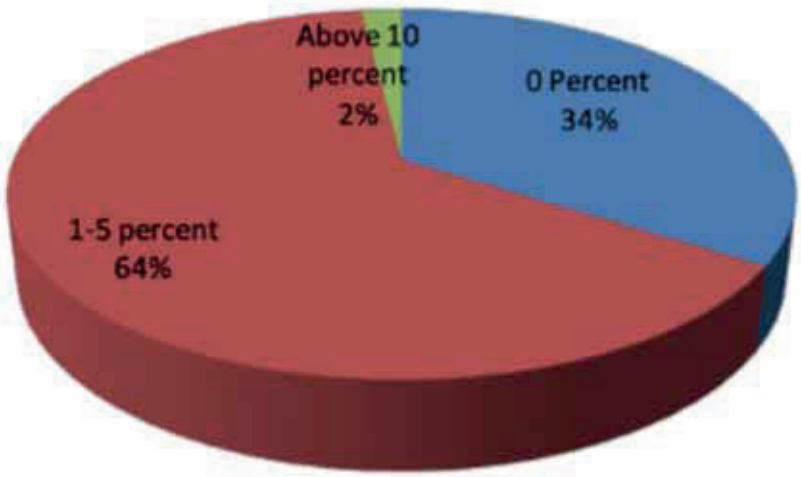

Figure 1: Percentage of Students with Disability

3.3 Availability of Safe Room for the Resilience

The schools are having a greater number of children should have safe rooms to protect the children from any type of emergency or disasters. "A safe room is a location where staff can rapidly seek refuge from a potentially violent person and order building-wide protective actions, such as an emergency lockdown and summon emergency assistance". The study found that about 30 percent of the schools are not having even single safe room in school premises. About 23 percent of the schools are having 1-2 safe rooms and six percent of the schools are having 3-5 safe rooms. Majority (41 percent) of the schools are having more than 5 safe rooms in their school for their resilience.

Table 3: Number of Safe Rooms

No. of Safe Rooms	Frequency	Percent
1-2	82	23.0
3-5	22	6.0
> 5	148	41.0
0	108	30.0
Total	360	100.0

3.4 Perception of Risk

It is observed from the figure 2 that, more than one third (37 percent) of the teachers perceived that fire as immediate risk for their school. About 22 percent of the respondents perceived that earthquake as immediate risk for their school. About 11 percent of the respondent's perceived building collapse as immediate risk for their school. It is assumed that 11 percent of the schools building are not safe. About nine percent of the respondents perceived that food poison as immediate risk followed by about six percent of respondent's perceived flood and landslide as immediate risk respectively. Only eight percent of the respondents perceived epidemic disease as immediate risk. It is observed from the table that all teachers are having perception about risk and proved that all schools are having a perceived risk.

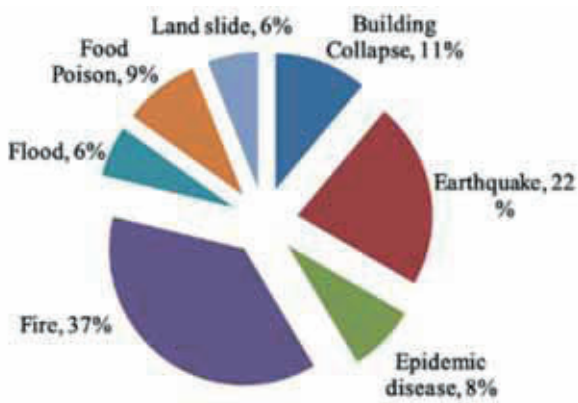

Figure 2: Perception of Immediate Risk

3.5 Most Devastating Disaster

This section analyses the perception of teachers about disaster which has most devastating consequences. Majority (43 percent) of the respondents perceived earthquake as most devastating disaster followed by nearly one fourth (24 percent) of the respondents perceived fire as most devastating disaster. About 12 percent of the respondent's perceived food poison as most devastating disaster. About six percent of the respondents perceived flood, building collapse as most devastating disaster respectively. Only five percent of the respondents perceived epidemic disease as most devastating disaster. Over all it is observed that all the teachers could able to identify the most devastating disaster.

Table 4: Most Devastating Disaster

Type of Risk	Frequency	Percent
Building Collapse	22	6.0
Earthquake	154	43.0
Epidemic Disease	18	5.0
Fire	88	24.0
Flood	22	6.0
Food Poison	42	12.0
Land Slide	14	4.0
Total	360	100.0

3.6 Greater Risk and Preparedness Plan for Resilience

It is observed from the figure 3 that one third (33 percent) of the respondents perceived that earthquake as greater risk to their school but only 27 percent of the schools are having earthquake preparedness plan for the resilience followed by 29 percent of the respondents perceived fire as greater risk and about 58 percent of the schools are having fire preparedness plan. It is observed from chart majority of the schools are having preparedness plan for fire only. About 10 percent of the respondents perceived flood as greater risk and only six percent of the schools are having flood preparedness plan. About eight percent of the people perceived building collapse as greater risk and

only four percent of the schools are having preparedness plan. It is observed from the chart that, all types of risks are prevalent in study area and some schools are having preparedness plan for the resilience. It is a step towards child centric disaster risk reduction and the effort needs to be appreciated. At the same time, other schools also should follow the schools which have preparedness plan to strengthen their resilience.

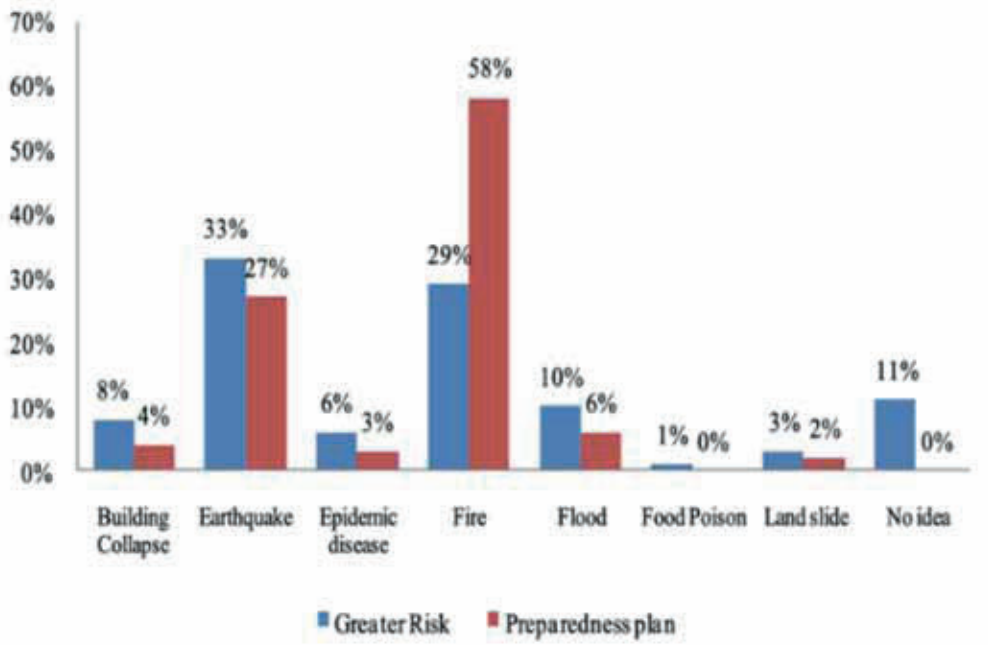

Figure 3: Greater Risk and Plan

3.7 Experience

It is evident from Table 5 that, fortunately majority (77 percent) of the schools have not experienced any type of disasters in past five years. Remaining 23 percent of the schools are experienced any one of the following disasters such as building collapse, earthquake, epidemic disease, fire, flood and food poison. About five percent of schools are experienced fire, flood respectively.

Table 5: Experience of Disasters

Type of Disaster	Frequency	Percent
No	278	77.0
Yes	10	23.0
Total	360	100.0

3.8 Frequency of Disaster Experience

It is revealed from the figure 4 that, 10 percent of schools experienced one time earthquake in past five years and two percent of schools are experienced two times earthquake in past five years. About three percent of schools experienced three times earthquake and followed by only one percent of schools experienced more than five times in past five years. It is evident from chart that the frequency of experience of earthquake is much less.

Seven percent of schools experienced one time fire and one percent of schools experienced three times fire in past five years. About eight percent of schools experienced one time flood and one percent of schools experienced three times flood and four times respectively. Only two percent of schools are experienced more than five times flood. Building collapse is one of the major risks perceived by the teachers and reported that about four percent of schools experienced one time building collapse followed by one percent of schools experienced two times building collapse in past five years.

The five percent of respondents reported that one time their school experienced food poison. Followed by one percent of respondents reported their school experienced more than five times food poison. Food poison is a manmade disaster that is repeated in same schools which needs mechanism to reduce the risk. About eight percent of respondents reported one time they experienced epidemic disease. About five percent of schools experienced three times epidemic disease. Only one percent of schools are experienced epidemic disease more than five times. Five percent of schools experienced one time landslide and one percent of schools experienced three time land slide in past five years. It is observed from the figure that frequency of experience of disaster is high but number of schools experienced is much less.

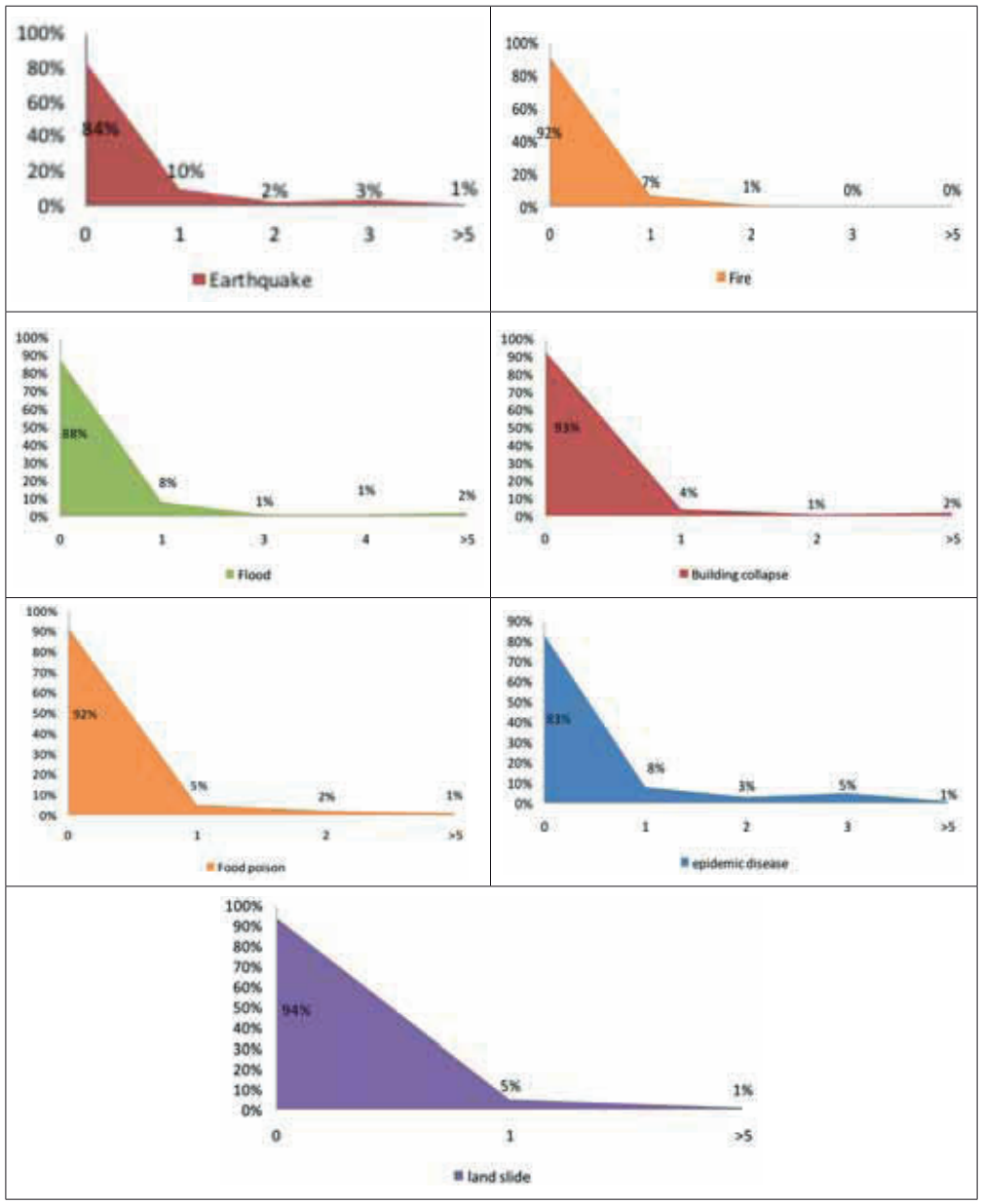

Figure 4: Frequency of Disasters

3.9 Perception of Students on Resilience

It is evident from table 6 that majority (78 percent) of students are agreed they are resilient to any disasters and remaining 22 percent of students are vulnerable. Similarly, about 80 percent of students agreed they are resilient to fire emergency and remaining 20 percent of students are vulnerable. More than half (70 percent) of the students are resilient towards flood disaster followed by only 62 percent of the students said they are resilient to building collapse. More than one third of respondents reported their students aware are resilient to epidemic disease. Less than half (48 percent) of the respondents reported their students resilient towards landslide disaster. It is appreciable that schools in both the state have taken good initiatives to create awareness and strengthen the resilience among the students at the same time about 20 percent of students are said they are not resilient on any disaster which is a most vulnerable group and their capacity needs to be enhanced.

Table 6: Students Perception on Resilience

Types of Disaster	No		Not Sure		Yes		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Earth quake	18	5.0	60	17.0	282	78.0	360	100.0
Fire	28	8.0	44	12.0	288	80.0	360	100.0
Flood	34	9.0	74	21.0	252	70.0	360	100.0
Building Collapse	50	14.0	86	24.0	224	62.0	360	100.0
Epidemic Disease	46	13.0	64	18.0	250	69.0	360	100.0
Land Slide	70	19.0	116	32.0	174	48.0	360	100.0

3.10 Teachers Perception on Resilience

It is evident from Table 7 that majority (86 percent) of teachers said they are resilient to any disaster and remaining 14 percent of them are not agreed. Similarly, about 88 percent of teachers and staffs said their school is resilient to fire emergency and remaining 12 percent not agreed. More than half (74 percent) of the teachers said their school is resilient to flood disaster followed by only 76 percent of the teachers said their school is resilient on building collapse. More than three fourth of teachers said their school is resilient to landslide. Nearly three fourth (73 percent) of teachers said their school is resilient to manage epidemic disease. It is appreciable that both the state has taken good initiatives to strengthen the school resilience. At the same time, about 10 percent of teachers are not agreed that their school is resilient to any disaster.

Table 7: Teachers Perception on School Resilience

Types of Disaster	No		Not Sure		Yes		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Earth quake	6	2.0	46	13.0	308	86.0	360	100.0
Fire	12	3.0	30	8.0	318	88.0	360	100.0
Flood	28	8.0	66	18.0	266	74.0	360	100.0
Building Collapse	24	7.0	62	17.0	274	76.0	360	100.0
Epidemic Disease	44	12.0	52	14.0	264	73.0	360	100.0
Land Slide	24	7.0	12	3.0	324	90.0	360	100.0

3.11 Conduct of Safety Drills to Strengthen Student's Resilience

It is revealed from the figure 5 that 16 percent of the schools never conduct the safety drill being located in earthquake seismic zone III and experienced disasters many times. About 43 percent of schools are conducting safety drills once in a year which will not help the students at all. About 60 percent of schools are not concern on safety drills. About 11 percent of schools once in a month, 20 percent of schools once in a quarter and 11 percent of schools once in six months only conducting safety drills to strengthen

the resilience of school children. As per NDMA guidelines, once in a week, the schools are supposed to conduct safety drill but schools are not conducting.

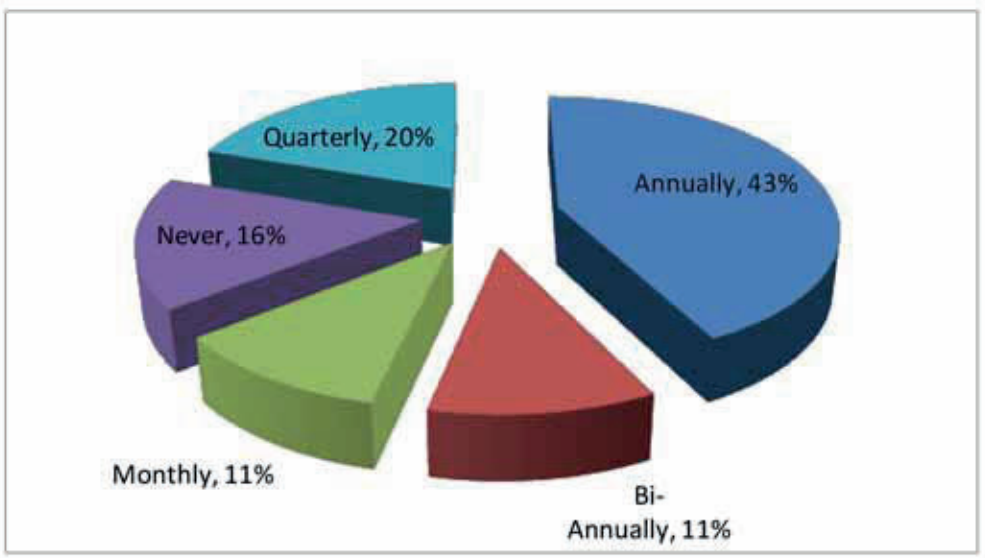

Figure 5: Conduct of Safety Drills

3.12 Constraints for Safety Drills

It is revealed from the Table 8 that majority (60 percent) of the schools reported that lack of expertise is constrain for conducting safety drills followed by 18 percent of the schools reported that lack of manpower is a constrain to conduct safety drills. About 14 percent of schools reported manpower is constrain to conduct the safety drill. Only 8 percent of the schools reported that budget is constrained for conducting safety drill. State Disaster Management Authority should take necessary steps to solve the issue of expertise, budget and manpower to ensure regular conduct of safety drills for strengthening school resilience .

Table 8: Constraint for Conduct of Safety Drill

Constraints	Frequency	Percent
Budget	4	8.0%
Expertise	34	60.0%
Manpower	10	18.0%
Time	8	14.0%
Total	360	100.0%

3.13 Disaster Management Plan

It is revealed from the figure 6 that, majority (48 percent) of school disaster management plan is good. Only five percent of schools having very good disaster management plans. One third of schools disaster management plan is fair. About six percent of schools disaster management plan is weak and seven percent of schools disaster management plan document does not exist. It is observed from the figure that half the schools disaster management plan is not good where intervention is required.

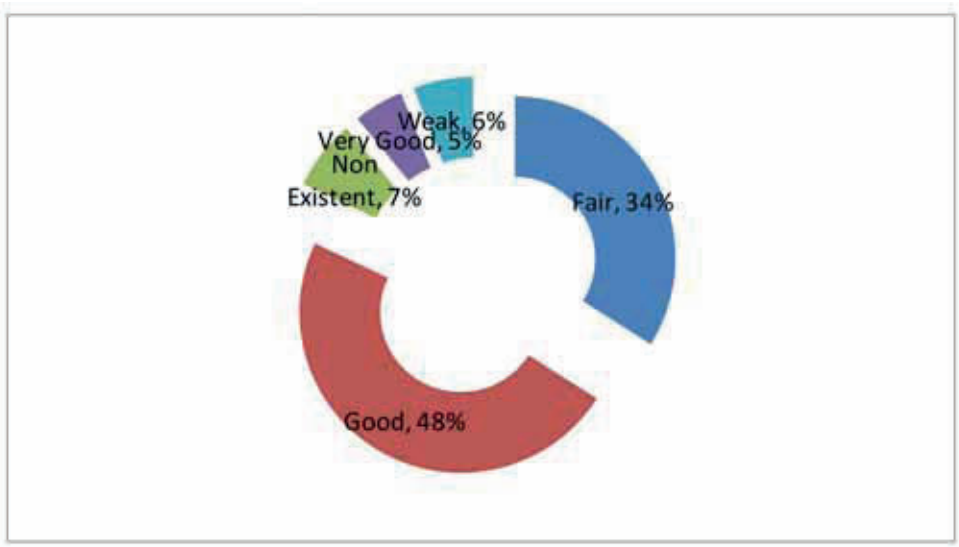

Figure 6: Status of Disaster Management Plan

It is apparent from the Table-9, that nearly three fourth (74 percent) of the respondents reported their staff should undergo disaster management training. The SDMA and training institutes should take necessary steps to train the teachers to strengthen school resilience. One fourth (27 percent) of the schools have allocated budget for disaster/ emergency planning which is a good intervention by the schools. Allocated budget should be used effectively. Only 56 percent of the respondents reported that their school disaster management plan considered students with disabilities. The remaining schools should give special focus on students with disability. More than half (62 percent) of the respondents reported that their school needs to conduct different safety drills for different disasters. Overall there is a demand for training, sensitization on disability inclusive disaster risk reduction, and conduct of safety drills. SDRF and DMA should take this opportunity to strengthen the school's resilience.

Table 9: Needs of the School

Types of Disaster	No		Not Sure		Yes		Total	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Training	78	22.0	16	4.0	266	74.0	360	100.0
Budget for Plan	220	61.0	44	12.0	96	27.0	360	100.0
Consier Disabled	116	32.0	44	12.0	200	56.0	360	100.0
Conduct of Different Drill for Disaster	112	31.0	26	7.0	222	62.0	360	100.0

3.14 Association of Selected Independent Variables with the Disaster Management Plan

3.14.1 State

The table depicts that the calculated chi square value (17.600) is higher than the tabulated value leading to a null hypothesis. "There is no association between state and Disaster management plan is rejected". It means that there is a significant association between states and disaster management plans.

3.14.2 Location of School

The table reveals that the calculated chi square value (47.395) is higher than the tabulated value leading a null hypothesis. "There is no association between location of schools and disaster management plan is rejected". It means that there is a significant association between location and disaster management plans.

Table 10: Association of Selected Independent Variables with the School Resilience

S. No.	Independent Variables	Chi-square (X^2)
1	State	17.600
2	Location of School	47.395**
3	Number of Students	69.345**
4	Ownership of School	13.819
5	Type of School	31.372
6	Percent of Students with Disability	71.646**
7	Greater Risk of Schools	103.25**
** Correlation is significant at the 0.01 level of probability * Correlation is significant at the 0.05 level of probability		

3.14.3 Number of Students

The table reveals that the calculated chi square value (69.345) is higher than the tabulated value leading a null hypothesis. "There is no association between number of students and school resilience is rejected". It means that there is a significant association between number of students and school resilience.

3.14.4 Ownership of School

It is evident that the calculated chi square value (13.819) is lesser than the tabulated value leading a null hypothesis. “There is no association between the ownership of school and school resilience is accepted.” It means that there is no association between the ownership of school and school resilience.

3.14.5 Students with Disability

The table reveals that the calculated chi square value (71.646) is higher than the tabulated value leading a null hypothesis. “There is no association between percent of students with disability and school resilience is rejected”. It means that there is a significant association between percent of students with disabilities and school resilience.

3.14.6 Greater Risk

The table reveals that the calculated chi square value (103.25) is higher than the tabulated value leading a null hypothesis. “There is no association between greater risk of schools and school resilience is rejected”. It means that there is a significant association between greater risk of schools and school resilience.

4. Conclusion

Schools in Goa and Maharashtra have taken a good effort towards school resilience in terms of disaster/emergency plan, awareness among students on do’s and don’ts and awareness among teachers, conducting safety drill and doing their level best. At the same time, one fifth of the schools are weak in disaster management plan and lack of awareness among students so the teachers needs to give importance to strengthen the resilience among the students . The schools also mentioned their constrains on conducting safety drill such as lack of budget, lack of expertise and lack of time. The SDMA, NDRF and SDRF have a greater role to build the capacity of those vulnerable schools.

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