Identification of potential integration of GEDSI (gender, disability, social inclusion) in the comprehensive school safety model for flood disasters at SMAN 1 Mojolaban

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Abstract. The study evaluates the readiness of schools to implement the Comprehensive School Safety (CSS) program with a focus on integrating Gender, Disability, and Social Inclusion (GEDSI). The study conducted at SMAN 1 Mojolaban, located in Sukoharjo Regency, which has a high potential for flooding. The population of SMAN 1 Mojolaban students is 1046 and the samples is 217 students. CSS measurement has three indicators: safe learning facilities, school safety management and continuity of education, and risk reduction and resilience education. The measurement of GEDSI implementation has six indicators: school commitment, curriculum, information dissemination, school facilities, supervision systems, and cooperation. The study results showed that overall, the CSS level at SMAN 1 Mojolaban is still very low (28.09%). The pillar 1, the facilities and infrastructure section has the lowest level of readiness (13.36%). This shows that there still needs to be more tools and facilities can use to reduce disaster risk. The implementing GEDSI at SMAN 1, Mojolaban is still low, as seen from the average value (24.86%). The lowest value is school facilities (12.67%). This shows the lack of facilities that can support vulnerable groups.

1 Introduction

Geographically, Indonesia locates between 2 continents, namely Asia and Australia, and two oceans, namely the Indian Ocean and the Pacific Ocean. The other hand, Indonesia is an archipelago located on the equator. Indonesia gets a tropical climate that results in relatively high rainfall. Based on data from BMKG 2023, rainfall in Indonesia in 2023 was recorded at 1,562.6 mm per year with 128 rainy days. The high rainfall also brings threats in the form of natural disasters that can come at any time. The high rainfall can result in the risk of natural disasters, one of which is flooding. The floods have a meaning in the broader community as a natural phenomenon, with an event of excess water that the drainage network in an area cannot accommodate which can cause detrimental waterlogging [1]. The DIBI 2023, it recorded that there were 1255 flood events in Indonesia, which is relatively high.

Sukoharjo Regency is one of the areas in Central Java with a relatively high risk of flooding. The vital reason why Sukoharjo Regency is prone to flooding is that the Bengawan Solo River crosses its territory, along with several small rivers, such as Kali Pepe and Kali Anyar [2]. It recorded that Sukoharjo Regency experienced a major flood in 1966, resulting in significant loss of life, infrastructure damage, and agricultural land [3]. The flooding in Sukoharjo Regency can disrupt social activities in the community. The one is educational activities at SMAN 1 Mojolaban, 350 meters from the Bengawan River tributary. The distance bases on the classification Rendrarini [4] included in the area with high flood disaster vulnerability.

People who have limitations that make it difficult for them to live their daily lives is what are called a vulnerable group. According to Pradana et al. [5] the vulnerable groups consist of the elderly, children, pregnant women, and groups with chronic health problems. They are often victims when flooding occurs. They require special treatment due to their limitations. The result, awareness needs of the importance of prioritizing vulnerable groups in dealing with natural disasters such as floods. The awareness can be increased early through existing educational units. The education is training or providing knowledge to society so that they can play a role in it. The providing education from an early age can help increase a person's awareness of their role when a flood occurs. According to Cerulli [6], education is vital in improving a person's understanding of the risks involved in a disaster. The vulnerable groups are also often engaged in educational activities, which makes education quite complex in reducing the risk of catastrophe. Given the presence of vulnerable groups in academic activities, an

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academic program needs to establish standards for disaster mitigation activities.

According to Ariani [7], Comprehensive School Safety (CSS) is an effort to protect educational units from the threat of disaster. It expects to create a safe and comfortable environment for students and all school residents. The main objective of CSS is to ensure that the rights of school residents are fulfilled even in times of emergency, such as natural disasters. To realize this, CSS consists of activities such as forming a disaster preparedness team, socialization of disaster preparedness, and evacuation simulations. With the CSS program, it hopes that, besides academics, facilities, and infrastructure, it can meet disaster management needs.

The implementation of CSS is still carried out generally without considering vulnerable groups. The results in disaster management still at high risk of causing victims, especially vulnerable groups. For this reason, gender equity, disability, and social inclusion (GEDSI) need to carry out CSS activities. The GEDSI itself is an approach that aims to create an inclusive environment that guarantees equal rights and participation for everyone, including vulnerable groups such as women, people with disabilities, and marginalized communities. The GEDSI approach in CSS can reduce the risk of high casualties. Because, GEDSI aims to involve every individual in an educational unit to participate and have equal access to participation regardless of gender, disability, condition, or social background. Implementing the GEDSI approach in CSS is needed to ensure equality in disaster mitigation participation. The research conducted by Rimbawan [8], showed that the implementing of the GEDSI approach to disaster management in Bali Province produced positive results. The increasing community participation demonstrates the strengthening of disaster preparedness. This aligns with the goal of CSS to create inclusive and safe schools for all school members. The GEDSI approach can utilize to develop schools with optimal CSS, ensuring they are well-prepared to face disasters inclusively. One of the schools that needs a GEDSI approach in CSS is SMAN 1 Mojolaban, which has a high potential for flooding. Therefore, research is required to identify the potential for GEDSI integration in the CSS flood model at SMAN 1 Mojolaban.

2 Method

This study uses a survey design with quantitative descriptions to provide a picture of the numbers between the two existing variables. The research conducted at SMAN 1 Mojolaban, which locates in Sukoharjo Regency, Central Java Province. The determination of the location took into account the high flood disaster risk index in the area. The selection of the research location based on the level of the school area's vulnerability index to flood disasters, with SMAN 1 Mojolaban is including in the high category based on the flood vulnerability map of Sukoharjo Regency in 2023. the addition, based on its location in the river border area and according to Gay [9], the border area is an area to accommodate overflow water that is at high risk of flooding. The population of students at SMAN 1 Mojolaban is 1046, and the researcher took a sample of 217 students.

Data collection used a questionnaire to obtain respondents' behavior, preferences, and facts. The study uses two variables, namely CSS and GEDSI. The CSS variable in this study will focus on three indicators: safer learning facilities, school security and educational continuity management, and risk reduction and resilience education. The GEDSI variable consists of four indicators: access, participation, control over resources and decision making, and benefits from policies and programs. In this study, the Spearman rank correlation technique will be used to analyze the relationship between variables based on existing data. Spearman's rank is a statistical tool that tests the association hypothesis between two variables with an ordinal scale (ranking) [10]. In this case, Spearman's rank tries to find the correlation between two variables with a ranking system, especially useful for analyzing data that are not normally distributed.

Since this research focuses on only one high school, there is a risk that the data collected may not be sufficiently varied. The concentrating data on a single school also limits the ability to generalize the relationship between CSS and GEDSI to other schools, as the characteristics of the school in this study may differ significantly from those of different institutions. Furthermore, the use a quantitative descriptive approach produces data lacking the depth needed to capture the dynamics within the school entirely.

3 Results and discussion

The results of this study will discuss how the CSS level and GEDSI implementation are at SMAN 1 Mojolaban. The results can see in Fig. 1 for the CSS level and Figure 2 for the GEDSI implementation level.

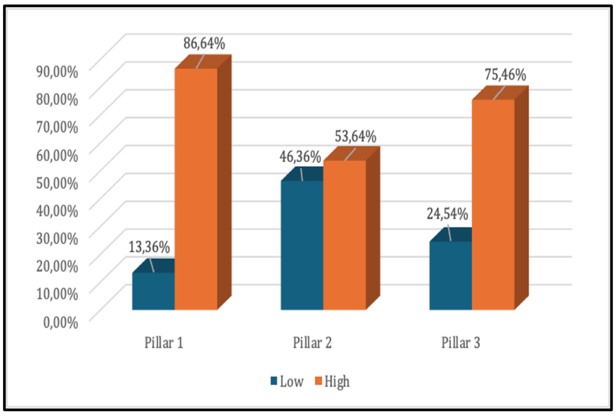

Fig. 1. The implementation of CSS (comprehensive school safety).

Figure 1 shows that overall, the level of CSS implementation at SMAN 1 Mojolaban is still very low (28.09%). The CSS readiness level table at SMAN 1 Mojolaban, pillar 1 has the lowest level of readiness (13.36%). The existing dataindicate that schools still pay insufficient attention to the availability of tools and facilities for natural disaster prevention. Facilities such as good drainage, disaster alarms, and evacuation routes can be used to support disaster prevention and preparedness efforts. Furthermore, more attention needs to improve facilities for disaster-safe school programs. The highest indicator is in pillar 2 (46.36%): school security and educational continuity management. The result shows that the school is good enough to provide training and also the formation of an emergency team to handle floods. The existing training and the formation of an emergency team will only be able to work optimally if the facilities and infrastructure are adequate [11]. The result shows a reasonably high gap between awareness of conducting training in dealing with floods and low awareness of providing sufficient and proper facilities to support it. In addition, there still needs to be more awareness to provide disaster mitigation material in learning to increase student awareness and reduce the risk of existing disasters.

The implementing of CSS based on data is constrained, especially by the lack of existing facilities. The readiness of school to handle natural disasters is strongly influenced by the availability of adequate tools and facilities for implementing the CSS program [12]. The availability of facilities is vital in ensuring the safety of school residents by ensuring the availability of tools that can be used by school residents when a natural disaster occurs. To optimize the implementation of CSS, school needs several facilities, including an early warning system for disasters, evacuation routes, and medical equipment for first aid. The one factor that shows that the implementation of CSS in schools is still not exemplary is inadequate facilities, as demonstrated as by Dapodik data in 2024.

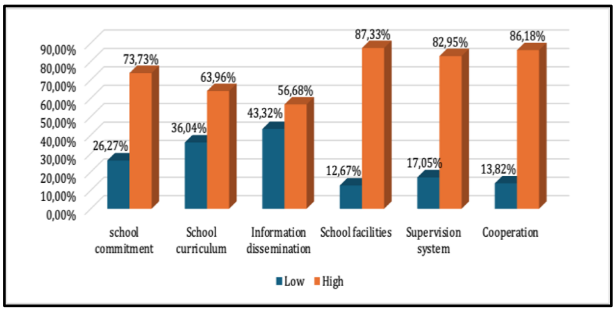

Fig. 2. The implementation of GEDSI (gender, disability and social inclusion).

Based on Fig. 2, it knows that the implementation of GEDSI at SMAN 1 Mojolaban is still low, as can be seen from the average value (24.86%). This shows that the school still needs to implement GEDSI by looking at the low value of the six indicators used to measure this readiness: school commitment, school curriculum, Information dissemination, school facilities, supervision system, and cooperation. The lowest value is shown in the information dissemination indicator (43.32%). It appears that the school does not frequently conduct socialization on the importance of implementing gender equality in disaster management. The school has not tried to inform students about their roles, particularly girls and people with disabilities, in disaster management activities. As a result, this lack of outreach is ineffective, as it fails to reach many stakeholders.

The indicator with the highest value is school facilities (87.73%). This indicates that the facilities at SMAN 1 Mojolaban are pretty good, with adequate infrastructure that is friendly to vulnerable groups and upholds GEDSI principles. However, according to the 2024 Dapodik data, the provision of evacuation routes for disabled individuals remains minimal. The school still needs to treat its students equally in disaster management activities. Based on the data, the lack of information about disasters is due to the media used by schools, which still do not accommodate students with disabilities. The press remains inaccessible to students with physical, intellectual, motor, and sensory impairments.

Additionally, the dissemination of disaster information is unengaging and difficult to understand. Most information delivers through oral instruction by teachers, which is less engaging and less effective for students. The gap in the indicators of information dissemination and school facilities shows that there is awareness of the importance of GEDSI in disaster management. It still cannot be realized by providing fair facilities for all elements of the school. The result, it hinders the development of disaster mitigation activities in schools. According to research by Hafida [13], school disaster mitigation must be carried out early, with adequate facilities and infrastructure.

Table 1. The formatting sections, subsections, and subsubsections.

		CSS	GEDSI
CSS	Correlation Coefficient	1.000	0.545**
	Sig. (2-tailed)		0
	N	217	217
GEDSI	Correlation Coefficient	0.545**	1.000
	Sig. (2-tailed)	0	
	N	217	217

Based on table 1, the results of the Spearman rank analysis show that the correlation coefficient between the CSS and GEDSI variables is 0.545. The values shown are positive, which indicates a positive relationship between CSS and GEDSI. The increase in the GEDSI value will also increase the CSS value. The significance value (p-value) as a description of the relationship between CSS and GEDSI is 0.000. Because, the p-value <0.01, this shows that the relationship between the two variables is significant at a 99% confidence level (0.01 level). In other words, this relationship is robust and unlikely to occur by chance. It shows a meaningful relationship between the GEDSI and CSS variables. The data analysis at SMAN 1 Mojolaban shows that the ion of the GEDSI and CSS concepts is still minimal. It indicates that SMAN 1 Mojolaban is still unprepared to face disasters, especially floods. The leading cause is the lack of facilities supporting disaster mitigation activities, especially for vulnerable groups needing special disaster management treatment. The findings in this study indicate that schools still need to be ready to provide security for students.

Another factor that influences the minimal implementation of CSS in schools is the limited resources allocated to the school. The main limitation is the less-than-optimal budget. It causes several repairs and delays in the construction of existing facilities. It is the same as the research results conducted by Ginting [14], which shows that proper funding is needed to implement a program. Training for every school community in dealing with disasters, especially floods, is still challenging to realize routinely. With this, government policies can question, as well as the initiation of the GEDSI and CSS programs in schools. The lack of regulations that can bind and encourage the implementation of GEDSI and CSS still makes technical support very low. The planning for resource distribution needs to be given more attention so that it is distributed evenly and on target. In addition, the school still needs to make a policy to include GEDSI and CSS in school activities. It is due to the main factor, namely, the absence of binding regulations or laws. This bases on Yustikia's research [15], which shows the importance of regulating a program according to the expected goals.

These results require further study by the government and the SMAN 1 Mojolaban school to promote GEDSI and CSS. The evacuation policies that are still general still do not pay attention to the needs of people with disabilities and women. The training is needed to increase awareness of each element in the school and pay more attention to vulnerable groups during natural disasters, especially floods. In addition, the involvement of groups such as parents, outside communities, and stakeholders can help implement CSS and GEDSI in school activities.

The implementation of GEDSI in schools for CSS is essential but is hindered by inadequate facilities. The available facilities are often not accessible to vulnerable groups, which contributes to low levels of school preparedness in facing disasters. The insufficient facilities are due either to a lack of funding from the school or to inadequate allocation of funds for creating disaster preparedness facilities that are accessible to these groups. This issue is not solely the school's responsibility but also results from the government's failure to provide appropriate funding.

This study has limitations in the scope of the area, as it only focuses on one high school in Sukoharjo, namely SMAN 1 Mojolaban. It provides an opportunity for further research by expanding the scope of the high school to high schools throughout Sukoharjo Regency to see the relationship between CSS and GEDSI. The disasters studied also focus on one natural disaster, namely, floods. It hopes that further research can conduct with other natural disasters or involve more than one type of disaster. In addition, further studies can consider differences in school characteristics, such as accreditation status, number of students, geographic location (urban or rural), and the level of school preparedness in dealing with disasters.

4 Conclusion

The conclusion of the analysis of the implementation of the Disaster Safe School Program (CSS) and the integration of GEDSI (Gender, Disability, and Social Inclusion) at SMAN 1 Mojolaban shows that the level of readiness of this school is still very low. The CSS value at this school is 28.09%, with the first pillar, namely safe learning facilities, having the lowest level of readiness (13.36%). It indicates more infrastructure and disaster mitigation facilities, such as good drainage, disaster alarms, and evacuation routes. The second pillar, namely school security and education continuity management, has the highest level of readiness (46.36%). The training and formation of emergency teams at this school are only optimal when supported by adequate facilities, reflecting the gap between awareness of disaster mitigation and the availability of facilities.

The implementation of GEDSI is also still low, with an average of 24.86%, indicating a lack of facilities for vulnerable groups, especially in providing evacuation routes for people with disabilities. Although there have been efforts to socialize the importance of the role of women and disabilities in disaster mitigation, this awareness has not been fully realized. The relationship between CSS and GEDSI at SMAN 1 Mojolaban shows a significant positive correlation (0.545) with a p-value of 0.000, indicating that increasing GEDSI scores can increase CSS scores. The budget and the regulatory limitations from the government and the lack of internal school policies hinder optimal implementation. From these results, it recommends that there be further studies and technical support from the government and schools to improve the implementation of GEDSI and CSS, especially in paying attention to the needs of vulnerable groups, such as people with disabilities and women, during disasters.

Practical recommendations that can give from this study are in the form of improving school readiness in dealing with natural disasters. The methods that can do include developing an inclusive evacuation plan, providing comprehensive disability awareness training for staff, securing increased funding for improving facilities that accommodate vulnerable groups, and advocating for policy changes at the national level. Although this study uses the theme of natural disasters, such as floods, which do not refer to natural disasters as a whole, it hopes that these findings will provide insight into the importance of GEDSI as an approach used for implementing CSS in schools that also have the same potential for natural disasters. With this recommendation, it hopes that it can help schools realize they have a safe and inclusive learning environment. Future research with similar or related themes can use this study as a reference. This study can develop in the future by making a broader scope than the district, or it can also choose the type of disaster in general, or other disasters.

References

1. R. Balahanti, W. Mononimbar, and P. H. Gosal, Analysis of flood vulnerability levels in Singkil District, Manado City. J. spasial, **11**, 69–79 (2023) (in Indonesian). https://ejournal.unsrat.ac.id/v3/index.php/spasial/article/download/51447/44169/121650
2. C. S. Yordan, Perancangan kampanye sosial ‘Kali Resik, Solo Apik’ sebagai upaya penyelamatan sungai dari pencemaran di kota surakarta. Thesis, Institut Seni Indonesia, Surakarta, 2018. (in Indonesian). http://repository.isi-ska.ac.id/2675/1/CHARLES%20SARI%20YORDAN.pdf
3. N. I. Kholidah, Floods and aid in Surakarta: Philanthropy during the 1966 Solo flood. Al-Isnad J. Islam. Civiliz. Hist. Humanit., **3**(1), 15–30 (2022) (in Indonesian). https://doi.org/10.22515/isnad.v3i1.5255
4. D. Rendrarini et al., Identifikasi jenis ancaman bencana dan perkiraan dampaknya pada lingkungan sekitar. J. Penelit. dan Pengabdi. Kpd. Masy. UNSIQ, **11**(2), 93–101 (2024) (in Indonesian). https://doi.org/10.32699/ppkm.v11i2.6730
5. A. A. Pradana, Casman, and Nur’aini, Pengaruh kebijakan social distancing pada wabah Covid-19 terhadap kelompok rentan di Indonesia. J. Kebijak. Kesehat. Indones. JKKI, **9**(2), 61–67 (2020) (in Indonesian). https://jurnal.ugm.ac.id/jkki/article/view/55575
6. D. Cerulli et al., The role of education in increasing awareness and reducing impact of natural hazards. Sustain. **12**(18), 1–14 (2020). https://doi.org/10.3390/su12187623
7. F. Ariani, Penerapan satuan pendidikan aman bencana (spab) di SMA negeri 8 Mataram. Indones. J. Educ. Dev. **2**, 108–117 (2021) (in Indonesian). https://doi.org/10.5281/zenodo.4781865
8. I. P. D. Rimbawan and A. Nurhaeni, Gender equality, disability and social inclusion approach to disaster management policy: The case of the Bali disaster response authority. J. Ilmu Sos. dan Ilmu Polit. **13**(2), 169–192 (2024) (in Indonesian). https://doi.org/10.15575/jispo.v13i2.28396
9. F. S. Gay, F. Warouw, and E. D. Takumansang, Perencanaan kawasan sempadan sungai sawangan di Kota Manado. J. Perenc. Wil. dan Kota, **5**(1), 105–117 (2018) (in Indonesian). https://ejournal.unsrat.ac.id/index.php/spasial/article/view/19284
10. Y. Yudihartanti, Penentuan hubungan mata kuliah penelitian dan tugas akhir dengan korelasi rank spearman. Jutisi J. Ilm. Tek. Inform. dan Sist. Inf., **6**(3), 1691–1694 (2017) (in Indonesian). http://dx.doi.org/10.35889/jutisi.v6i3.268
11. Y. A. Wibowo, R. Y. A. Ratih Puspita Dewi, Lintang Ronggowulan, and Y. Miftakhunisa, Penguatan literasi mitigasi bencana angin puting beliung untuk peningkatan kapasitas masyarakat Desa Munggur, Kabupaten Boyolali, Jawa Tengah. J. War. LPM, **23**(2), 165–179 (2020) (in Indonesian). http://journals.ums.ac.id/index.php/warta
12. Y. A. Wibowo, L. Ronggowulan, A. Fatonah, and R. A. A. Fajariyah, Membangun masyarakat tangguh bencana melalui sosialisasi dan edukasi modal sosial di Kabupaten Klaten. Abdi Geomedisains, **1**(2), 68–78 (2021) (in Indonesian). https://doi.org/10.23917/abdigeomedisains.v1i2.198
13. S. H. N. Hafida, Urgensi pendidikan kebencanaan bagi siswa sebagai upaya mewujudkan generasi tangguh bencana. J. Pendidik. Ilmu Sos., **28**(2), 1–10 (2020) (in Indonesian). https://doi.org/10.23917/jpis.v28i2.7374
14. E. V. Ginting, R. R. Ginting, R. J. Hasibuan, and L. M. Perangin-angin, Analisis faktor tidak meratanya pendidikan di SDN0704 Sungai Korang. J. Pendidik. Indones. **3**(4), 407–416 (2022) (in Indonesian). https://doi.org/10.59141/japendi.v3i04.778
15. N. W. S. Yustikia, Pentingnya sarana pendidikan dalam menunjang kualitas pendidikan di sekolah. Guna Widya J. Pendidik. Hindu, **4**(2), 1 (2019) (in Indonesian). https://doi.org/10.25078/gw.v4i2.1053