Community Perception Towards Dam Disaster and Flood Vulnerability in the Surrounding Area of Pergau Dam of Kuala Yong, Kelantan

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***Abstract*— Pergau Hydroelectric dam in Kuala Yong, Jeli, Kelantan is Malaysia's second-largest hydroelectric power station, utilizing runoff water from Pergau River hill streams. The dam serves multiple purposes, including flood control, water supply, irrigation, power generation, and recreation. However, downstream communities may face heightened flood vulnerability due to their proximity to the river. This study aims to enhance community awareness and perception towards dam disaster and flood vulnerability in the surrounding area of Pergau Dam. It outlines three objectives: (i) to identify the lives and livelihoods of the communities directly affected by any probable failure of the Pergau dam, Kuala Yong (before and after); (ii) to alert and educate the affected community as a disaster resilient community through capability formation and capacity building human resource; and (iii) to assess the effectiveness of early warning system and DRM program conducted by TNB to the communities downstream of Pergau dam. A quantitative approach was utilized for data collection through 500 questionnaire surveys from four villages within the Pergau dam. The study reveals that lack of direct disaster experience influences perceptions, emphasizing the need for educational initiatives. Local environmental awareness contributes to community knowledge of risks. Respondents expressed concerns about potential harm, necessitating disaster risk management to alleviate apprehension. While most respondents expressed readiness to face disasters, targeted interventions are needed for those unprepared, with a focus on emergency alarms, safety equipment, and designated refuge areas. The study concludes that addressing disparities in safety perceptions through targeted awareness programs and community engagement can enhance overall disaster resilience in the Pergau Dam area.**

***Keywords*— downstream communities; awareness and perception; disaster; flood vulnerability; community engagement**

I. INTRODUCTION

The Pergau Hydroelectric Dam, located in Kuala Yong, Jeli, Kelantan Darul Naim, is a significant infrastructure component that stands as Malaysia's second-largest hydroelectric power station [1]. Constructed in 1991 and completed in 2000, the massive dam utilizes runoff water from Pergau River hill streams originating in the Main Range hills and flowing through the Jeli area. With a crest length of 750m, as reported by SJ Sultan Ismail Petra, Pergau – Kuala Yong Dam Safety ERP Section 8, the dam plays a crucial role in hydroelectric power generation. The downstream communities along the Pergau River, such as Kg. Pendok, Kg. Batu Melintang, Kg. Kalai, Kg. Sg Long, and Kg. Gunong faces heightened flood vulnerability. It is attributed to the proximity of some houses and structures to river reserves, placing them at risk in the event of dam release.

Dams are vital infrastructures that serve multiple purposes, including flood control, irrigation, water supply, hydroelectric power generation, recreation, and navigation (ICOLD, 2018; WCD, 2000). Over time, their roles have expanded to provide additional social and environmental benefits, particularly in mitigating flood risks and offering recreational opportunities, further demonstrating their long-term effectiveness (Petts & Gurnell, 2005). The Pergau Hydroelectric Dam in Kelantan is a prime example of such multifunctionality. Constructed to harness the headwaters of the Pergau River, the dam system integrates a power station with a reservoir designed to support energy production and water regulation. The Pergau reservoir features a gross storage capacity of 62.5 million m^3 at full supply level (FSL), covering an area of 4.3 km^2 and serving a catchment area of 222 km^2, with an FSL elevation of 636 meters

(Tenaga Nasional Berhad, 2000). This infrastructure illustrates how modern dam projects address diverse societal, economic, and environmental needs through integrated design.

Despite their many benefits, dams inherently present significant risks to surrounding communities, particularly due to the potential for structural failure and subsequent catastrophic flooding (ICOLD, 2018). Such failures can result in widespread social, economic, and environmental devastation, including loss of lives, displacement, and long-term ecological impacts (Wang & Xu, 2011). Ensuring dam safety requires continuous monitoring, meticulous maintenance, scheduled rehabilitation, and regular safety inspections to sustain operational functionality (Foster & Fell, 2000). Comprehensive dam safety programs are therefore indispensable in reducing the likelihood and severity of failures. Equally important is strengthening community awareness and perception of dam-related risks, enabling residents and relevant agencies to act swiftly and effectively during emergencies. Enhancing local preparedness and knowledge ensures that dam safety is not only a technical responsibility but also a shared societal commitment (UNDRR, 2017).

II. Literature Review

The Disaster Risk Management (DRM) Cycle serves as a vital framework for systematically addressing and reducing the adverse impacts of natural and human-induced hazards (Coppola, 2015). It encompasses essential actions such as prevention, mitigation, and preparedness, which collectively strengthen resilience and reduce vulnerabilities. In this study, Nepal's Disaster Management Cycle was examined and compared with Malaysia's framework to identify similarities and differences in approach. Nepal's cycle is divided into two distinct phases: pre-disaster and post-disaster. The pre-disaster phase highlights proactive measures, with particular emphasis on the integration of Early Warning Systems (EWS), which play a pivotal role in preparedness, mitigation, and prevention (UNDRR, 2017). The post-disaster phase, on the other hand, emphasizes crisis management activities such as response, rehabilitation, and reconstruction (Shrestha et al., 2014). By contrasting these models, this study underscores the critical importance of embedding EWS within broader DRM strategies to minimize losses and ensure timely interventions.

A comparative analysis of the Nepal and Malaysia Disaster Management Cycles revealed that while both share core components—such as prevention, mitigation, preparedness, response, and recovery—their approaches to Early Warning Systems (EWS) differ significantly. In Nepal, EWS is continuously emphasized as a central element within the pre-disaster phase, ensuring that communities remain informed and proactive in addressing risks. This ongoing integration strengthens preparedness and enhances the ability of local populations to take timely action (Shrestha et al., 2014). In contrast, Malaysia's Disaster Management Cycle includes EWS but tends to employ it closer to the onset of hazards, functioning more reactively than proactively (Coppola, 2015). This difference in emphasis influences the overall effectiveness of each country's approach. Nepal's proactive, community-oriented use of EWS contributes to stronger resilience outcomes, while Malaysia's reactive application highlights the need to strengthen early warning integration across all disaster management phases (UNDRR, 2017).

A. Community's Preparedness and Involvement

Local communities are often the most affected during disasters, as they experience the heaviest losses in terms of life, livelihood, and essential resources (Shaw, 2012). This underscores the importance of community-based disaster risk reduction (CBDRR) initiatives that place local populations at the center of disaster management strategies. The efficacy of such initiatives becomes most evident when community members actively participate in planning, decision-making, and implementation processes (Allen, 2006). Active participation helps to reduce redundancy in interventions, improve the acceptability and relevance of disaster programs, and strengthen the resilience of vulnerable groups (Maskrey, 2011). Moreover, participatory approaches encourage the use of indigenous knowledge, which is critical for identifying risks and designing locally appropriate solutions. By engaging local communities directly, disaster risk

reduction efforts not only empower individuals but also foster equity and inclusiveness, ultimately minimizing inequalities and ensuring more effective and sustainable outcomes (Shaw, 2012; Allen, 2006).

Kelantan, located on the East Coast of Peninsular Malaysia, is highly vulnerable to recurrent floods due to the influence of the Northeast Monsoon, which occurs between November and March each year (Tengku et al., 2018). Historically, monsoon-related floods have severely impacted the Kelantan River Basin and Sungai Golok, leading to significant disruption of livelihoods, infrastructure damage, and displacement of communities (Chan, 2015). However, in recent years, flood occurrences have expanded beyond the traditional monsoon season, suggesting shifts in hydrological and climatic patterns. For example, a flash flood in May—typically regarded as part of the dry season—illustrates how unpredictable rainfall and climate variability are altering established flood regimes in the state (Parvin et al., 2016). Such deviations highlight the growing complexity of flood risk in Kelantan and the urgent need for adaptive disaster risk reduction measures tailored to evolving climatic conditions.

This unanticipated variation in flood timing reflects possible shifts in the onset and withdrawal of the monsoon season, closely linked to broader climatic variability and hydrological cycle alterations (Parvin, Takahashi, & Shaw, 2016; TNB, 2020). Traditionally, Kelantan's flood patterns were predictable, coinciding with the Northeast Monsoon period between November and March. However, changes in rainfall distribution and intensity now disrupt established seasonal cycles, increasing uncertainty in flood events (Chan, 2015). These deviations significantly threaten agriculture, as farmlands are more exposed to sudden inundation during non-monsoon months, resulting in crop loss and long-term food insecurity. Similarly, critical infrastructure, including roads, bridges, and public utilities, becomes increasingly susceptible to damage from unexpected flood occurrences.

The vulnerability of communities such as Kuala Yong in Jeli illustrates the compounded risks associated with these climatic changes. Situated in flood-prone areas with limited protective vegetation, the community is highly exposed to erosion, sedimentation, and recurrent flooding (Tengku, Rahim, & Othman, 2018). The disruption of livelihoods and the destruction of property intensify socio-economic vulnerabilities, making it difficult for households to recover between disasters (Muda et al., 2020). This evolving environmental scenario underscores the urgent need for adaptive flood management and community-based disaster risk reduction. Integrating scientific knowledge with localized experiences is essential to develop proactive strategies, ensuring resilience for communities most at risk of hydrological uncertainties.

Focusing on dam-related disasters and the case of Kuala Yong, Jeli, highlights how environmental degradation exacerbates disaster risks. The absence of windbreaks and permanent vegetation has resulted in severe erosion, leaving the landscape highly vulnerable to flooding and sedimentation (Muda, Yusop, & Ismail, 2020). The accumulation of sediments in the heavily silted river continues to reduce the storage capacity of the lake, increasing the likelihood of overflow during heavy rainfall events (Chan, 2015). Such conditions directly endanger lives, property, and local livelihoods, particularly for communities reliant on agriculture and fisheries. The ability of local populations to adapt and cope with these hazards is central to sustaining their livelihoods. However, when natural disasters exceed community coping capacities, the resulting social, economic, and physical consequences are severe. These challenges emphasize the need for integrated disaster risk management strategies that combine environmental conservation with community-based resilience building (Parvin, Takahashi, & Shaw, 2016).

III. Materials And Methods

This research adopts a quantitative research design to ensure systematic and reliable data collection and analysis. One-to-one questionnaire surveys are employed as the primary data collection tool, enabling the researcher to directly engage with respondents and gather detailed insights on their experiences, perceptions, and preparedness regarding flood-related disasters. The survey locations were carefully

selected based on their geographical vulnerability to dam-related flooding, particularly in the areas surrounding the Pergau Dam in Kuala Yong, Jeli. The study targets a sample population of 500 residents distributed across high-risk villages, including Kampung Gunong, Kampung Batu Melintang, Kampung Pendok, and Kampung Lawar. These areas were identified as being significantly exposed to flood hazards due to their proximity to rivers and low-lying terrain, making them representative of communities most at risk (Creswell & Creswell, 2018). Random sampling was employed to ensure inclusivity and to reduce potential biases, thereby increasing the validity of the data collected (Saunders et al., 2019).

To strengthen the analysis, the study applies advanced statistical techniques using IBM SPSS Statistics Version 27. Analytical methods include cross-tabulation to identify patterns and relationships among variables, chi-square tests to assess associations between categorical factors, and correlation analysis to evaluate the strength and direction of relationships between variables. Additionally, the Relative Importance Index (RII) is utilized to prioritize the factors influencing community preparedness and awareness, allowing for clearer identification of the most critical issues faced by residents (Al-Hammad, Assaf, & Al-Shihah, 1997). These methods ensure a robust quantitative framework that not only validates the research findings but also contributes to the formulation of evidence-based recommendations for enhancing community resilience and disaster preparedness strategies. By combining rigorous sampling methods with sophisticated statistical analysis, the research provides a comprehensive and reliable understanding of flood-related disaster risks in the context of Kuala Yong, Jeli.

IV. Results And Findings

The findings of this study contribute to a deeper and more comprehensive understanding of community awareness and perception of disasters, particularly in relation to dam safety. By systematically analyzing the responses gathered through the survey, the study provides valuable insights into the current level of preparedness among local populations and highlights critical gaps that need to be addressed. Such insights serve as a foundation for designing targeted awareness programs and safety campaigns that are culturally appropriate and context specific. Furthermore, the survey outcomes suggest the most effective approaches for improving knowledge dissemination and community engagement. Ultimately, these findings can guide strategies aimed at increasing resilience, reducing vulnerability, and minimizing loss of life and injuries during dam-related disaster events.

A. Disaster-Related Experience

The result in Table 1 indicates that, of the 500 respondents, more than half the respondents have never experienced a catastrophic disaster, with 67.8% respondents (339). In contrast, the remaining have experienced a catastrophic disaster with 32.2% (161).

TABLE 1
Frequency of catastrophic disasters faced by the respondents

Category	Frequency	
	Number (n)	Percentage (%)
Yes	161	32.2
No	339	67.8
Total	**500**	**100**

To identify the relationship between respondents' knowledge of the type of disaster that usually occurs in the area and the residential area near the river, the cross-tabulation test is used. The results indicate that there was a significant relationship between the residential area near the river and the knowledge of the type of disaster that usually occurs in the area (Chi-square= 23.861, df= 9 - 39, P= 0.000 – 0.005); this is presented in Table 2. According to the result, those who live near the river are acknowledged with each

type of disaster that usually occurs in the area. It appears likely that such bondage would influence their knowledge of the upcoming disasters. Although they are not truly affected, indirectly they are aware of the disasters.

TABLE 2
Chi-square tests on the respondents' knowledge of the type of disaster that usually occurs in the area and the residential area near the river

Respondents' knowledge of the type of disaster that usually occurs in the area	Residential area near the river		
	Value	df	p-value
Major/Red flooding	97.044	39	0.000
Mud flooding	63.342	21	0.000
Flash flooding	115.565	24	0.000
Extreme cold	41.958	15	0.000
Prolonged drought	48.111	12	0.000
Landslide	61.927	30	0.000
Others	23.861	9	0.005

Chi-square= 23.861, df= 9 - 39, P= 0.000 – 0.005

To examine the relationship between respondents' knowledge of the signs of an incoming disaster and their period of residence in the Jeli area, a cross-tabulation test was conducted, as presented in Table 3. The chi-square analysis revealed a statistically significant relationship between the two variables (Chi-square = 375.905, df = 176, p = 0.000). This finding suggests that the duration of residence influences the level of awareness and knowledge of disaster warning signs among community members. Individuals who have lived in the area for a longer period appear to possess greater familiarity with disaster indicators, likely due to accumulated experience from repeated exposure to flood events. This relationship underscores the importance of local knowledge in strengthening disaster preparedness and resilience within vulnerable communities.

TABLE 3
Chi-square test between the respondents' knowledge on signs of incoming disaster and period of residence in Jeli area

Respondents' awareness	Period of residence in Jeli area	
	Value	p-value
Sign of incoming disaster	375.905	0.000

Chi-square= 375.905, df= 176, P= 0.000

Additionally, another cross-tabulation test was carried out to examine the relationship between respondents' knowledge of the signs of an incoming disaster and their level of education, as presented in Table 4. The chi-square test results demonstrate a statistically significant relationship between these two variables (Chi-square = 245.218, df = 176, p = 0.000). This outcome indicates that education level plays an important role in shaping respondents' awareness and understanding of disaster warning signs. Individuals with higher levels of education tend to demonstrate greater knowledge, likely due to increased access to information, improved comprehension of disaster-related materials, and enhanced critical thinking skills. These findings highlight the need to strengthen disaster education and awareness programs, especially targeting groups with lower educational attainment, to ensure equitable disaster preparedness across communities.

TABLE 4
Chi-square test between the respondents' knowledge on signs of incoming disaster and respondents' education level.

Respondents' awareness	Education level	
	Value	p-value
Sign of incoming disaster	245.218	0.000

Chi-square= 245.218, df= 176, P= 0.000

From the results presented in Table 3 and Table 4, both p-values for the relationship between respondents' knowledge of the signs of an incoming disaster with their period of residence and education

level are 0.000. This indicates that statistically significant relationships exist in both cases. The findings suggest that the longer individuals reside in the Jeli area, the more familiar they become with disaster indicators, likely due to repeated exposure and experiential learning. Similarly, respondents with higher levels of education tend to demonstrate greater awareness, reflecting their ability to access, process, and apply disaster-related information more effectively.

B. Increase Knowledge Related to Disaster

The results on respondents' preferred methods for increasing disaster-related knowledge were analyzed using the Relative Importance Index (RII), as summarized in Table 5. Findings indicate that disaster preparedness training was identified as the most effective and preferred method, achieving the highest RII score of 0.5532. This suggests that respondents value structured training programs that enhance their ability to anticipate and respond to disaster events. The second most preferred method was disaster emergency training or drills, with an RII score of 0.4900, highlighting the importance of practical exercises in reinforcing preparedness. Disaster management training provided by government agencies ranked third (RII = 0.4464), while community involvement in disaster management ranked fourth (RII = 0.4212). These findings emphasize the combined importance of formal training, hands-on practice, and active community participation in building disaster resilience.

TABLE 5
RII Rank on the method to increase knowledge related to disaster ranked by the respondents

Method to increase disaster-related knowledge	**Responses**								**RII**	**Rank**
	Very significant		**Significant**		**Insignificant**		**Very insignificant**			
	F	**Rscore**	**F**	**Rscore**	**F**	**Rscore**	**F**	**Rscore**		
Disaster preparedness training	172	688	166	498	65	130	67	67	0.5532	**1**
Disaster emergency training / Drill	127	508	114	342	149	298	77	77	0.4900	**2**
Disaster management training from government agencies	74	296	121	363	176	352	105	105	0.4464	**3**
Community involvement in disaster management	133	532	59	177	72	144	200	200	0.4212	**4**

C. Awareness of the Dam Construction

The results presented in Table 6 indicate that most respondents, representing 89%, are aware of the presence of a dam in the area. In contrast, only 11% of respondents reported being unaware of its construction. Among those who indicated awareness, a portion demonstrated more specific knowledge, with 22% correctly identifying the dam by name as the Pergau Dam. This finding highlights a generally high level of awareness, although detailed recognition remains comparatively limited.

TABLE 6
Frequency of awareness of the construction of the dam

Category	Frequency	
	Number (n)	Percentage (%)
Yes	445	89.0
No	55	11.0
Total	**500**	**100**

A chi-square test was conducted to examine the relationship between respondents' awareness of the dam's construction and their residential area. As shown in Table 7, the analysis revealed a statistically significant association between these two variables (Chi-square = 17.303, df = 2, p = 0.000). This indicates that the location of residence strongly influences the level of awareness regarding the existence of the Pergau Dam. Residents living closer to the dam site demonstrated higher awareness compared to those residing further away.

TABLE 7
Chi-square test on the respondents' awareness of the construction of the dam and their residential area

Residential area	Respondents' awareness on the construction of dam					
	Yes		No		Total	
	F	%	F	%	F	%
Kg. Batu Melintang	192	38.4	15	3.0	207	41.4
Kg. Gunong	173	34.6	17	3.4	190	38.0
Kg. Pendok/Kg. Lawar	80	16.0	23	4.6	103	20.6
Total	445	89.0	55	11.0	500	100

Chi-square= 14.483, df= 2, P= 0.000

D. Perception of the Dangerous of the Dam

The results presented in Table 8 indicate that a majority of respondents, accounting for 70.8%, believe that the construction of a dam is not dangerous and does not pose harm to the surrounding environment. In contrast, 29.2% of respondents expressed concerns, stating that dams can bring potential risks and hazards. Among this group, several specific dangers were identified, including the risk of flooding (4.4%), the possibility of dam failure or breakage (2%), and the risk associated with excessive water release (1.4%). These perceptions reflect varying levels of community confidence in dam safety.

TABLE 8
Frequency of perception of the dangerousness of dam

Category	Frequency	
	Number (n)	Percentage (%)
Yes	146	29.2
No	354	70.8
Total	**500**	**100**

E. Function of the Dam

The results in Table 9 reveal that the majority of respondents (87.8%) recognized the primary function of the dam as generating electricity for the surrounding areas. The second most acknowledged function was its role as a flood barrier, reported by 48% of respondents. Other functions identified included water management (13.6%), support for agricultural activities (9.8%), and recreational purposes (8%). A very small proportion (0.2%) highlighted the dam as a source of income for the community. Interestingly, 3.4% of respondents believed that the dam serves no function, indicating varying perceptions of its overall importance.

TABLE 9
Frequency of function of dam according to the respondents

Category	Frequency	
	Number (n)	Percentage (%)
Electricity source	439	87.8
Flood barrier	240	48.0
Water management	70	13.6
Agricultural area	49	9.8
Recreational area	40	8.0
Others	18	3.6

A cross-tabulation test was carried out to examine the relationship between respondents' knowledge of the dam's functions and their awareness of its construction, as presented in Table 10. The chi-square results indicate a statistically significant relationship (Chi-square = 67.539, df = 29, P = 0.000), suggesting that awareness of the dam's construction strongly influences respondents' understanding of its functions. In other words, those who were more aware of the dam's existence demonstrated a better understanding of its multiple roles, such as electricity generation, flood control, and water management, compared to respondents with limited awareness of the construction.

TABLE 10
Chi-square test between the respondents' knowledge on the function of dam and their awareness on the construction of dam

Respondents' awareness	Awareness on the construction of dam	
	Value	p-value
Function of dam	67.539	0.000

Chi-square= 67.539, df= 29, P= 0.000

F. Advantages of the Dam

Based on the results in Table 11, the majority of respondents agreed that the dam provides several advantages to the surrounding area. The most significant benefit highlighted was its role as a source of electricity (87.4%), followed by its capacity to control floods (48.4%) and ensure a sufficient water supply (46.6%). Additionally, some respondents recognized the dam's contribution to creating recreational areas (11%) and supporting agricultural activities (8.6%). A very small percentage (0.2%) considered the dam as a source of income. Nevertheless, 5.2% of respondents expressed the opinion that the dam offers no advantage to the surrounding area.

TABLE 11
Frequency of function of dam according to the respondents

Category	Frequency	
	Number (n)	Percentage (%)
Sufficient water supply	233	46.6
Source of electricity	437	87.4
Control flood	242	48.4
Create recreational area	55	11.0
Creating agricultural area	43	8.6
Others	27	5.4

A cross-tabulation test was conducted to examine the relationship between the perceived advantages of the dam and the respondents' period of residence in Jajahan Jeli, as presented in Table 12. The chi-square results revealed a significant relationship (Chi-square = 189.111, df = 124, P = 0.000), indicating that the length of residence in the Jeli area significantly influenced respondents' perceptions of the dam's advantages. In other words, individuals who had lived longer in the area demonstrated greater awareness of the dam's benefits, highlighting the role of long-term exposure and lived experiences in shaping community knowledge and perceptions.

TABLE 12
Chi-square test on the advantage of dam and period of residence in Jeli area

Respondents' awareness	Period of residence in Jajahan Jeli	
	Value	p-value
Advantages of dam	189.111	0.000

Chi-square= 189.111, df= 124, P= 0.000

Another chi-square test was conducted to examine the relationship between respondents' knowledge of the advantages of the dam and their awareness of its construction, as shown in Table 13. The results revealed a significant relationship (Chi-square = 64.011, df = 31, P = 0.000). This finding indicates that respondents' understanding of the dam's advantages was strongly influenced by their awareness of its construction. In other words, greater awareness of the dam's establishment contributed to a deeper recognition of its potential benefits.

TABLE 13
Chi-square test on the advantage of dam and their awareness on the construction of dam

Respondents' awareness	Awareness on the construction of dam	
	Value	p-value
Advantages of dam	64.011	0.000

Chi-square= 64.011, df= 31, P= 0.000

G. Readiness to face Disaster

Based on the result in Table 14, the majority of respondents (83.6%) indicated that they are prepared to face potential disasters, while the remaining 16.4% reported that they are not adequately ready.

TABLE 14
Frequency of the readiness to face disaster

Category	Frequency	
	Number (n)	Percentage (%)
Yes	418	83.6
No	82	16.4
Total	**500**	**100**

H. Safety Aspect Needed to face Disaster

Responses regarding the safety aspects needed to face disasters are summarized in Table 15 below. An RII analysis was conducted to assess respondents' preferences on key safety measures. The findings indicate that a disaster emergency alarm is considered the most important safety aspect, receiving the highest RII score of 0.5992. This is closely followed by the provision of safety equipment, which ranked second with an RII score of 0.5988. The third most important aspect identified by respondents is the establishment of designated refuge areas, with an RII score of 0.4200. Lastly, the disaster management program was ranked as the least prioritized safety aspect, with an RII score of 0.3544. These results emphasize the community's strong preference for practical and immediate safety measures to enhance preparedness.

TABLE 15
RII Rank on the safety aspect to face disaster ranked by the respondents

Safety aspect to face disaster	Responses								RII	Rank
	Very significant		Significant		Insignificant		Very insignificant			
	F	Rscore	F	Rscore	F	Rscore	F	Rscore		
Disaster emergency alarm	167	668	197	591	110	220	19	19	0.5992	1
Safety equipment	191	764	183	549	65	130	54	54	0.5988	2
Refuge area	27	108	100	300	283	566	76	76	0.4200	3
Disaster management program	118	472	7	21	30	60	333	333	0.3544	4

V. DISCUSSION AND CONCLUSIONS

Based on the results and findings of the study, several important discussions can be drawn. First, a significant proportion of respondents reported that they have not personally experienced a catastrophic disaster. This lack of direct exposure may influence their perceptions of risk, as well as their awareness and engagement in proactive disaster preparedness efforts. Without firsthand experience, many individuals may underestimate the severity of potential threats, underscoring the need for comprehensive educational initiatives that provide simulations, drills, and awareness campaigns to enhance understanding of risks. Interestingly, those living in close proximity to the river demonstrated a higher level of awareness and understanding of potential disasters, even if they had not directly faced such events. This suggests that the local environment itself plays a role in shaping community perceptions of risk, as physical proximity to the dam or river system heightens awareness of potential hazards. Furthermore, the diverse perceptions regarding the dam's functions—from electricity generation to flood control and water management—reveal the importance of clear, consistent communication to promote accurate knowledge about the multipurpose role of the dam.

While the majority of respondents expressed confidence in their readiness to face potential disasters, the findings highlight the need for more targeted interventions aimed at those who remain unprepared. These individuals may lack access to knowledge transfer mechanisms, disaster training, or resources that build resilience, making them more vulnerable in times of crisis. Respondents as a whole prioritized disaster emergency alarms and safety equipment as the most crucial aspects for preparedness, reflecting the importance of practical tools such as early warning systems (EWS) and protective gear in disaster risk reduction. Refuge areas were also considered essential, emphasizing the community's recognition of the need for designated safe spaces during emergencies. However, disaster management programs were ranked lower in importance, which points to a potential gap in community education, training, and involvement in organized disaster response strategies. This highlights the importance of strengthening community-based programs that integrate drills, workshops, and knowledge-sharing sessions. By addressing these gaps and disparities, authorities and agencies can enhance overall disaster resilience and foster a stronger culture of preparedness around the Pergau Dam area.

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