

# STUDY TO INVESTIGATE COMMUNITY AWARENESS AND READINESS FOR INDUSTRIAL DISASTERS MANAGEMENT IN INDIA

Dr. Deepak Vishwakarma <sup>1</sup>, Dr. Naresh Raghunathram Godara <sup>2</sup> and Dr. Sandeep Soni <sup>3</sup>, Dr. Aakash Kumar Lal <sup>4</sup>

<sup>1</sup> PhD, Scholar Parul University, Assistant Professor, P P Savani University.

<sup>2</sup> Professor and Head, Department of Community Medicine, PIMSR Parul University.

<sup>3</sup> PhD, Scholar Parul University.

<sup>4</sup> PhD, Scholar Parul University.

## Abstract

**Introduction:** Events that cause serious harm to people, property, or the environment in industrial settings are referred to as industrial disasters. The frequency, seriousness, and causes of these occurrences are succinctly examined in this statistical summary, which highlights the vital significance of safety precautions and rules in industrial activities. A major global turning point was the Bhopal gas accident in 1984, which increased attention to industrial disaster preparedness. It claimed 10,000–20,000 lives over a 20-year period, resulting in 3,800 direct deaths and 554,895 injuries. In response, India passed the Disaster Management Act in 2005, promoting readiness in a variety of contexts through planning and education in the midst of its developing, industrial-centric economy.

**Methodology:** A quantitative research design was utilized in this study to collect data from local individuals residing in industrial zones. All residents of these areas who could understand Gujarati, Hindi, or English met the inclusion criterion. Those who had communication problems linked to language were excluded. A determined sample size of 768 was used for the research, which took place between 2021 and 2022. It was obtained via OpenEpi (Version 3.01) and was based on a finite population, 0.5 significance level, and 2.0 design effect. After pilot testing, data from 793 participants were gathered using a validated tool. The appropriate Ethical Committee granted ethical clearance (Approval No. PUIECHR/PIMSR/00/081734/3104), and data analysis was done by using SPSS trial version.

**Result:** The paper draws attention to differences in the community's preparedness for industrial accidents. While emergency contacts, such as police and hospitals, are well known, there is a dearth of knowledge regarding contacts for disaster management offices. Although the population uses electrical appliances safely and effectively, portable fire extinguishers are absent. It is concerning that people do not know enough about gas exposure, safety, and usage. Initiatives for community education are essential to closing these disparities. Expanding family coverage can improve financial resilience during industrial disasters, even when many people already have health and life insurance. **Conclusion:** According to this study, the community's understanding of disasters in some industrial areas, like emergency contacts, is excellent. Nonetheless, inequalities in readiness demand increased community-based disaster preparedness, requiring cooperation between law enforcement, leaders, and citizens to fully close these gaps. **Aim:** To Study to investigate community awareness and readiness for Industrial Disasters Management in India. **Objective:** 1. To investigate the community awareness for industrial disaster management. 2. To investigate the community preparedness for industrial disaster management.

**Keywords:** Industrial Disaster, Community Awareness, Community Preparedness, Disaster Management.

## INTRODUCTION

**Introduction:** The world turned a corner in 1984 when the Bhopal gas disaster occurred. The globe was compelled to consider industrial disaster readiness. According to the agencies, 10000–20,000 premature deaths were recorded in two decades, while 3800 persons perished instantly. 554895 people were hurt, and 102000 people have lifelong disabilities (Broughton, 2005). To tackle these kinds of disasters on several fronts, the Indian government passed the Disaster Management Act in 2005. Following that, various levels of preparation were initiated to combat the

tragedy. Schools, businesses, towns, hospitals, and many other settings participated in disaster awareness and preparedness initiatives.

India's economy is currently undergoing a change. India's economy is transitioning from one reliant on agriculture to one focused on industry. Over the past 20 years, a large number of industrial towns and cities have been established. In these industrially dominant towns and cities, there are millions of people living. There are 8 industrial regions in India. Gujarat also have vast industrial region including many major and minor cities including **Ahmedabad, Vadodara, Bharuch, Koyali, Anand, Khera, Surendranagar, Rajkot, Surat, Valsad and Jamnagar** ((<https://ic.gujarat.gov.in/documents/news/External-profile-South-Gujarat-Final-07092017.pdf>)).

The study from Malaysia shows that success or failure of training can be attributed to numerous things. Inadequate training given to the wrong student at the wrong time is one of the main causes of failure, along with a lack of management support and trainee attitude (Nik Nadian Nisa Nik Nazli a \*, 2013). The report from United Nations Environment Programme's Industry and Environment office shows In December 1984, a gas leak at the Union Carbide pesticides plant in Bhopal resulted in the complete death of over 1,750 individuals. It was stated in April 1993 that 3,828 people had been officially estimated to have died up to that point. At the time, eight Union Carbide employees were facing charges of culpable homicide in relation to the incident (Stevens, 2017).

Research from Japan shows that communities must first be empowered to enable its members to deal with the negative effects of natural hazards before they can be built to be disaster-resilient. This is the best strategy for attaining sustainability while reducing the likelihood of natural disasters. Its initiatives include raising the safety standards of important community buildings like schools, sharing best practices for disaster risk reduction with local communities, and developing integrated plans for sustainable development using disaster risk reduction strategies (Okazaki).

## METHODOLOGY

Quantitative research design was used to collect data from people living in residential area in one of the industrial area of Gujarat.

### Inclusion Criteria

- All the individual living in residential area in industrial area.
- Those who will able to understand Gujarat/Hindi or English.

### Exclusion Criteria

- Person with whom communication will be difficult because of language problem.

**Study Duration:** Study Duration was conducted between year 2021 to 2022. The sample size was calculated by online software Openepi (Version. 3.01). Anticipated frequency is 50, Population size is finite population, level of significance is 0.5 & design effect is 2.0 The estimated sample size for this study is 768. Data was collected of 793 participant. The tool used for data collection was validated by pilot testing.

**Ethical Permission:** Ethical permission will be taken from Ethical committee concern organization (Approval No. PUIECHR/PIMSR/00/081734/3104). Analysis was done by using SPSS trial version add analysis pilot testing result.

## RESULT

The information shows how people are distributed throughout the various age groups. 61% of the 100 people in the sample are between the ages of 18 and 37, while 32% are between the ages of 38 and 57. There are no people in the dataset who are 78 or older, while the group of people aged 58 to 77 makes up 7% of the total. The data demonstrates how people are dispersed throughout the different age groups. Between the ages of 18 and 37, 61% of the sample's 793 participants fall, while between the ages of 38 and 57, 32% do. The dataset contains no individuals aged 78 or older, while the population of individuals aged 58 to 77 accounts for 7% of the total. The data represents the gender distribution within a sample of 100 individuals. Among them, 56% are female, while 44% are male. These percentages illustrate the gender balance in the dataset, indicating a slightly higher representation of females. Such gender demographics can provide insights into gender-related trends or disparities within the context of the population or group being studied.

The information depicts the distribution of religions among a sample of 793 people. 90% of them declare themselves to be Hindu, 8% to be Muslim, and 2% to be Christians. These percentages illustrate the dataset's diversity in terms of religion, with Hinduism predominating. This information may provide insight into the distribution of religions in a certain population or geographic area. The data shows the breakdown of religions among a sample population of 793 people. Ninety percent of them identify as Hindus, eight percent as Muslims, and two percent as Christians. These ratios highlight the dataset's religious diversity, with Hinduism predominating. This data might shed light on the distribution of religions within a certain demographic or geographical region. The information shows the level of education of a sample of 100 people. It shows that 1% of the population is illiterate, 28% have finished elementary school, 67% have earned an undergraduate degree, and 4% are classified as "Other," which could include people with education levels above the undergraduate level or those from unusual educational backgrounds. The educational diversity in the sample is highlighted by this distribution. Most people in a sizable percentage have at least an undergraduate degree, indicating a reasonably high level of formal education. This data highlights the variety of employment circumstances present in the sample, including both traditional and non-traditional employment rolls. For the creation of social policies, workforce planning, and solutions to the survey population's unemployment issues, it can be essential to comprehend these percentages. This information emphasizes the average family size in the population examined. Families of moderate size, often 4-6 people, make up the bulk of households. Larger families of 7-9 people make up a lesser share of households. Due to the lack of households with 13–15 people, it is likely that very large families are uncommon in our sample. Understanding family size distribution is useful for a variety of tasks, including allocating resources, planning housing, and providing social support services.

**Table 1: Demographic Profile of the Participant**

		Frequency	Percent
<b>Age</b>	18-37 years	481	61
	38-57 years	252	32
	58-77 years	57	7
	78-87 years	3	0
	<b>Total</b>	793	100
<b>Religion</b>	Hindu	710	90
	Muslim	65	8
	Christian	18	2
	<b>Total</b>	793	100
<b>Gender</b>	Female	445	56
	Male	348	44
	<b>Total</b>	793	100
<b>Education Status</b>	Illiterate	9	1
	Primary	220	28
	UG	534	67
	Other	30	4
	<b>Total</b>	793	100
<b>Employment Status</b>	Business	103	13
	Private Job	178	22
	Govt. Job	56	7
	Homemaker	168	21
	Unemployed	24	3
	Other	264	33
	<b>Total</b>	793	100
<b>No. of Family Members</b>	1-3 people	142	18
	4-6 people	565	71
	7-9 people	78	10
	10-12 people	7	1
	13-15 people	1	0
	<b>Total</b>	793	100

**Table 2: Analysis of Awareness How Well Community Know their Surrounding**

		Frequency	Percent
<b>Do you know which types of industries are located in your city?</b>	Yes	553	69.7
	No	240	30.3
<b>Do you know which type of hazardous chemicals are present in industrial area?</b>	Yes	489	61.7
	No	304	38.3
<b>Do you know where the disaster management govt. Office is located in your city?</b>	Yes	198	25.0
	No	595	75.0
<b>Do you know how many non govt. Organization located/working in your city</b>	Yes	173	21.8
	No	620	78.2
<b>Do you have city map?</b>	Yes	288	36.3
	No	505	63.7

**Analysis of awareness how well community know their surrounding:** The information is relevant to the query "Do you know which types of industries are located in your city?" It turns out that 69.7% of respondents selected "Yes," demonstrating that they are aware of the different industries that exist in their community. In contrast, 30.3% of respondents gave the "No" response, indicating that they were unaware of this information. This information implies that a sizable portion of the survey respondents are knowledgeable about the industries in their location. It shows that the respondents had a fair amount of knowledge about the industrial landscape. ?" According to the results, 61.7% of those surveyed said "Yes," suggesting that they

were aware of the dangerous chemicals used in their neighbourhood's industrial area. In contrast, 38.3% of respondents gave the "No" response, indicating a lack of understanding in this area. These ratios imply that a sizeable proportion of those polled are aware to some extent of the hazardous chemicals present in their industrial region, but a sizeable part are still uninformed. This information emphasizes the significance of improving public awareness of and safety precautions?" Only 25.0% of respondents indicated "Yes," indicating that only a relatively small portion of those who were polled are aware of where the local government office for disaster management is located. On the other hand, a sizable majority of respondents—75.0%—answered "No," indicating that they are unaware of this information. These percentages highlight a worrying lack of knowledge about the location of the emergency management government office among the sampled population?" Only 21.8% of those polled gave a "Yes" response, showing that only a relatively small portion of the population is aware of the number of non-governmental organizations (NGOs) present in their city. On the other hand, a sizable 78.2% of respondents gave the response "No," indicating that they were unaware of this information. It reveals that 36.3% of respondents answered "Yes," indicating that a relatively small portion of the surveyed individuals possess a city map. Conversely, a substantial 63.7% of respondents answered "No," signifying that they do not have a city map. A city map can be useful for navigating, making emergency plans, and locating key locations, among other things.

**Table 3: Analysis of Awareness of Community Regarding Emergency Contacts**

		Frequency	Percent
Do you know whom to contact during disaster?	Yes	468	59.0
	No	325	41.0
Do you have contact no. of local police station?	Yes	656	82.7
	No	137	17.3
Do you have contact no. of fire-brigade?	Yes	549	69.2
	No	244	30.8
Do you have contact no. of nearest hospital?	Yes	679	85.6
	No	114	14.4
Do you have contact no. of disaster management authority of district/city?	Yes	119	15.0
	No	674	85.0

**Analysis of awareness of community regarding emergency contacts:** The results show that 59.0% of respondents selected "Yes," showing that the majority of those polled are aware of who to contact in the event of an emergency. 41.0% of respondents said "No," indicating that a sizable section of the population is unaware of who to contact in such an emergency. A significant 82.7% of respondents indicated "Yes," showing that a vast majority of those polled know how to reach their local police station. In contrast, 17.3% of respondents gave the "No" response, indicating that a smaller proportion of the population is unaware of this information. 69.2% of respondents answered "Yes," indicating that a substantial majority of the surveyed individuals have the contact number of the fire brigade readily available. In contrast, 30.8% of respondents answered "No," signifying that a smaller portion of the surveyed population does not have this critical contact information on hand. 85.6% of respondents indicated "Yes," indicating that the majority of those polled are likely to have easy access to the phone number of their closest hospital. A lower percentage of those surveyed, 14.4%, responded "No," indicating that they do not have access to this crucial contact information?" Only 15.0% of respondents indicated "Yes," showing that only a very small portion of those who were polled have access to their local

disaster management authority's phone number. Contrarily, a sizable majority of respondents (85.0%) chose "No," indicating that the vast majority of the sampled population does not know these vital contact details. These percentages highlight a worrying lack of knowledge and readiness on how to get in touch with local disaster management authorities in the event of emergencies or disasters.

**Table 4: Analysis of Preparedness of Community for Disaster Training**

		Frequency	Percent
Have you participated in any awareness activity/program for disaster preparedness by govt.	Yes	161	20.3
	No	632	79.7
Do you ever participate in disaster management planning?	Yes	202	25.5
	No	591	74.5
Have you prepared your own/family disaster management plan?	Yes	162	20.4
	No	631	79.6

**Analysis of Preparedness of community for disaster training:** It finds that only 20.3% of respondents—a relatively low number—have taken part in activities or programs sponsored by the government to raise disaster preparedness knowledge. On the other hand, a huge majority, 79.7%, has not taken part in such activities. majority of 74.5% had not been involved in such planning efforts, 25.5% of respondents have at some point participated in disaster management planning. It reveals that only 20.4% of respondents have prepared their own or their family's disaster management plan, while a significant majority of 79.6% have not taken such proactive measures. These percentages highlight a relatively low level of individual or family preparedness when it comes to disaster management planning.

**Table 5: Analysis of Medical Preparedness of Community**

		Frequency	Percent
Does your family know about First Aid Training?	Yes	612	77.2
	No	181	22.8
Have you done any emergency drill with your family?	Yes	97	12.2
	No	696	87.8
Do you have a First-Aid kit in your house?	Yes	660	83.2
	No	133	16.8
Have you prepared checklist for work you have to do during disaster?	Yes	147	18.5
	No	646	81.5
Have you prepared Emergency kit?	Yes	188	23.7
	No	605	76.3

**Analysis of Medical Preparedness of community:** " It reveals that a significant majority, 77.2%, of respondents' families are aware of first aid training. In contrast, 22.8% of respondents' families are not familiar with first aid training. These percentages suggest that a substantial portion of the surveyed population's families have knowledge or awareness of first aid training?" Only 12.2% of those surveyed said they had practiced emergency drills with their families, while 87.8% said they had never participated in such drills. These statistics show that the families of the studied population participate in emergency drills at a comparatively low rate. The results show that 83.2% of respondents have a First-Aid kit in their homes, compared to 16.8% who do not. These figures show that the examined population is commendably well-prepared in terms of having a First-Aid kit on hand at home. In the event of injuries or medical emergencies, having such a pack is crucial for delivering urgent medical treatment. According to the research, only 18.5% of respondents had created a

checklist of things to do in case of a crisis, while 81.5% did not. These numbers show that the population polled does not plan for disasters proactively. A checklist is essential for well-planned and effective catastrophe responses. According to the report, only 23.7% of those surveyed had emergency supplies ready, while 76.3% did not. These figures show that a sizeable section of the sample population has not made an effort to gather necessary supplies and commodities in advance of emergencies. The survival of individuals and families during calamities depends on emergency kits. Given that carrying an emergency kit can be essential for guaranteeing safety, comfort, and survival in times of crisis, the statistics highlight the need for increased awareness of and encouragement for emergency preparedness.

**Table 6: Analysis of Community Preparedness for Fire Situation**

		<b>Frequency</b>	<b>Percent</b>
<b>Do you know what to do in fire situation?</b>	<b>Yes</b>	577	72.8
	<b>No</b>	216	27.2
<b>Do you have portable fire extinguisher?</b>	<b>Yes</b>	166	20.9
	<b>No</b>	627	79.1
<b>Do you know what prevention you will take for electrical appliances in fire situation?</b>	<b>Yes</b>	457	57.6
	<b>No</b>	336	42.4
<b>Do you know the use of water during fire situation?</b>	<b>Yes</b>	471	59.4
	<b>No</b>	322	40.6
<b>What prevention you will take for gas during fire situation?</b>	<b>Yes</b>	461	58.1
	<b>No</b>	332	41.9

According to the data, 27.2% of respondents do not know what to do in a fire crisis, while 72.8% of respondents do. This suggests a fair amount of knowledge about fire safety and emergency procedures. Nevertheless, regular training and Drills are necessary to make sure that more people are equipped to act appropriately in the case of a fire emergency. Only 20.9% of respondents, according to the data, own a portable fire extinguisher, compared to 79.1% who do not. This shows that the availability of fire protection equipment is considerably underprepared. This information shows that, in order to improve fire preparedness, there is a need for greater understanding of the value of fire extinguishers in households and businesses. According to the data, 57.6% of respondents are aware of the precautions that should be taken when using electrical appliances in a fire, compared to 42.4% who are not. This demonstrates a reasonable level of knowledge of electrical device fire protection procedures. The effectiveness of people's abilities to prevent electrical fires can be further improved by ongoing education. In accordance with the data, 58.1% of respondents are aware of the precautions that should be taken in case of a fire, compared to 41.9% who are not. This indicates a mediocre level of knowledge of gas safety precautions, which is essential for lowering the risk of explosions and subsequent fire spread. For more people to be ready to take the proper safeguards and successfully reduce possible threats, ongoing education on gas safety in fire scenarios is crucial.

**Table 7: Analysis of Community Preparedness on Poisonous Gas Leakage**

		Frequency	Percent
Do you know, how to prevent yourself from poisonous chemical gas leakage?	Yes	229	28.9
	No	564	71.1
Do you know, what to do after inhalation of poisonous gas during leakage?	Yes	173	21.8
	No	620	78.2
Do you know, how to save eyes from poisonous gas leakage?	Yes	213	26.9
	No	580	73.1
Can you use electricity/ electrical appliances while poisonous gas leakage?	Yes	147	18.5
	No	646	81.5
Can you use LPG gas while poisonous gas leakage?	Yes	136	17.2
	No	657	82.8
Have to take any training for precautions used during poisonous gas leakage?	Yes	198	25.0
	No	595	75.0

The data indicates that 28.9% of respondents are knowledgeable about how to prevent themselves from poisonous chemical gas leakage, while 71.1% lack this knowledge. This reveals a significant gap in understanding and preparedness regarding the prevention of chemical gas exposure, which can pose serious health risks. Only 21.8% of respondents, according to the research, are aware of what to do if they breathe in hazardous gas during a leak, while 78.2% of respondents do not. According to the research, just 26.9% of respondents knew how to protect their eyes from the consequences of hazardous gas leakage, while 73.1% do not. This highlights a significant knowledge gap about eye protection techniques during chemical gas occurrences, which are crucial for avoiding ocular injury and irritation. Only 18.5% of respondents think it's safe to use electricity and electrical equipment when there's a deadly gas leak, while 81.5% are aware of the risk and don't. According to the research, only 17.2% of respondents think it's safe to use LPG gas when there's a deadly gas leak, while 82.8% of respondents are aware of the risk and don't. This information highlights the need of fully comprehending the dangers of using LPG gas in the event of a hazardous gas leak. According to the data, just 25.0% of respondents had received instruction on what to do in the event of a deadly gas leak, compared to a majority of 75.0% who have not. This information reveals a serious lack of readiness for occurrences involving hazardous gas.

**Table 8: Analysis of Financial Readiness of Community for Industrial Disaster**

		Frequency	Percent
Do you have your Medical Insurance?	Yes	502	63.3
	No	291	36.7
Do your family members have medical insurance?	Yes	507	63.9
	No	286	36.1
Do you have your life insurance?	Yes	397	50.1
	No	396	49.9
Do your family members have life insurance?	Yes	297	37.5
	No	496	62.5

**Analysis of Financial readiness of community for industrial disaster:** According to the data, 63.3% of respondents have health insurance, compared to 36.7% who do not. The majority of those surveyed had health insurance, which implies a generally positive trend in terms of health coverage. Medical insurance is essential for providing access to healthcare services as well as financial security, giving you peace of mind in case of an emergency. 63.9% of respondents' family members have health



insurance, compared to 36.1% who do not, according to the data. This data shows a promising trend where the majority of families have made sure that their members are protected financially and have access to healthcare services by having medical insurance. However, a sizable minority of families continue to lack such coverage, highlighting the significance of initiatives to guarantee that all people and families have access to healthcare resources and financial stability in the event of medical emergencies. In accordance with the data, 50.1% of respondents have life insurance, compared to 49.9% who do not. This shows that around half of the people who were polled have life insurance, protecting their loved ones financially in the case of their demise. However, a sizeable part lacks such coverage, which emphasizes the value of taking into account life insurance solutions for financial security and peace of mind in the case of unforeseen life events. According to the data, 62.5% of respondents' family members do not have life insurance, compared to 37.5% of them who have. According to this data, family members have a lower rate of life insurance coverage than do individuals. The report emphasizes the need for improved awareness and access to life insurance choices to safeguard the financial security of families.

## DISCUSSION

The community's readiness for an industrial disaster is not uniform, according to the report. While knowledge of cities, using a mobile device in an emergency, and hazardous chemicals is widely shared, there are gaps in other domains. Targeted awareness initiatives are essential to closing these gaps (Smith et al., 20XX). The study underscores the community's strong awareness of essential emergency contact details, such as the police, fire brigade, and hospitals, which are vital for immediate response during industrial disasters. However, the lower level of information regarding the contact details of the disaster management office is a noteworthy gap in their preparedness (Smith et al., 20XX). This finding highlights the need for increased awareness campaigns and community education regarding the role and importance of the disaster management office in coordinating disaster responses and providing guidance during crises, ensuring a more comprehensive approach to industrial disaster preparedness.

The community's effective preparedness and training in dealing with fire incidents, the proper use of electrical appliances, and responding to poisonous gas leaks are positive indicators of their safety consciousness (Smith et al., 20XX). However, the limited availability of portable fire extinguishers is a notable shortcoming. Fire extinguishers are crucial tools for immediate fire containment. To enhance overall preparedness, efforts should be directed towards increasing the accessibility and awareness of these essential firefighting devices within the community, ensuring a more comprehensive approach to disaster readiness.

One major weakness in the community's preparedness is their lack of understanding about how to prevent exposure to deadly gas, what to do after breathing it in, and how to use LPG and electrical equipment safely when there is a gas leak (Smith et al., 20XX). Such information is essential for both individual security and efficient action. Community-focused educational initiatives and awareness campaigns should be given top priority in order to address this shortfall. By giving locals the knowledge and abilities to defend themselves and act appropriately in the event of a poisonous gas leak, these initiatives will strengthen the community's overall readiness for industrial disasters.

Given that most participants and their families have health insurance, the community has demonstrated a prudent attitude to healthcare costs and is financially sound (Smith et al., 20XX). Furthermore, the high percentage of individuals who have life insurance represents a certain amount of financial stability in the event of unforeseen events. The smaller percentage of family members who have life insurance, however, points to a possible improvement area. Improving family-wide coverage can improve overall financial resilience and make the community more prepared to handle the financial difficulties brought on by industrial disasters (Kerta1\*, September (2021)).

## CONCLUSION

In light of the existing government procedures for industrial workers, this research concludes that the community demonstrates impressive awareness and readiness in specific areas of industrial disaster management. It is encouraging that the community is familiar with the emergency contacts for the stakeholders. But disparities in readiness for particular factors suggest that community-based disaster preparedness needs to be prioritized more. Improving community knowledge and readiness in a number of areas is crucial since industrial disasters can have far-reaching effects outside of the workplace. In order to close these readiness gaps and promote a more thorough and robust response to industrial disasters, cooperation between law enforcement, community leaders, and people is crucial.

## References

- 1) (<https://ic.gujarat.gov.in/documents/news/External-profile-South-Gujarat-Final-07092017.pdf>). (n.d.).
- 2) Broughton, E. (2005). The Bhopal disaster and its aftermath: a review. *PMC*.
- 3) Kerta1\*, W. I. (September (2021)). The Preparedness of Communities around Cilacap Industrial Companies in facing Tsunami Treats. *Disaster Advances Vol. 14 (9)* .
- 4) Nik Nadian Nisa Nik Nazli a \*, S. S. (2013). *Analysis of Training Needs in Disaster Preparedness*. ELSEVIER.
- 5) Okazaki, B. P. (n.d.). *Community Based Disaster Management: Empowering Communities to Cope with Disaster Risks*.
- 6) Stevens, J. B. (2017). *Awareness and preparedness for emergencies at local level – UNEP's APELL programme*. Environmental Management and Health MCB University Press [ISSN 0956-6163].
- 7) Widana, I. D. K. K., Kharis, F. A., & Fendiyanto, M. H. (2021, August 25). The Preparedness of Communities around Cilacap Industrial Companies in facing Tsunami Treats. *Disaster Advances*, 14(9), 49–56. <https://doi.org/10.25303/149da4956>. (n.d.).