

STRATEGY FOR STRENGTHENING KAMPUNG SIAGA BENCANA THROUGH A PARTICIPATORY INFORMATION SYSTEM IN UJUNGBERUNG BANDUNG

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Abstract: Kampung Siaga Bencana (KSB) is a community-based disaster risk reduction initiative aimed at strengthening local community capacity in disaster management. However, disaster information management at the grassroots level remains constrained by top-down and technocentric reporting systems, weak coordination among volunteers, fragmented data management, and limited community participation. This study aims to formulate the strategy for strengthening KSB through a Participatory Disaster Information System (*Sistem Informasi Partisipatif/SIP*) in Ujungberung, Bandung. The study employed a *Participatory Action Research* (PAR) approach by involving KSB volunteers as co-researchers, facilitated through the *Technology of Participation* (ToP) method. Data were collected through in-depth interviews, Focus Group Discussions (FGDs), observation, and documentation studies, and analyzed using the Miles and Huberman interactive model. The findings reveal five major community needs in developing the system: (1) integrated disaster data management across pre-disaster, emergency response, and post-disaster phases; (2) smartphone-based rapid reporting with real-time visual documentation; (3) volunteer competency mapping for tactical mobilization; (4) user-friendly application interfaces; and (5) managerial clarity regarding system operators within the KSB structure. The development of SIP transformed the previous system

(*SIGERCEP*) into a participatory digital platform that improved information management and emergency coordination while strengthening participation, sense of ownership, empowerment, and community resilience. The study also found that community strengthening is influenced not only by internal community capacities, but also by local leadership support, inter-agency communication, coordination among stakeholders, and linkages with government and disaster management institutions. The novelty of this study lies in integrating social work approaches, strengths perspective, community empowerment, and digital transformation into a participatory disaster information system model for community-based disaster risk reduction.

Keywords: Kampung Siaga Bencana (KSB); Participatory Information System; Community Empowerment; Strengths Perspective; Community Resilience.

Introduction

Disaster risk reduction has increasingly shifted toward community-based approaches that emphasize local participation, collective capacity, and social resilience. In Indonesia, one of the community-based disaster management initiatives developed by the government is *Kampung Siaga Bencana* (KSB), which aims to strengthen community preparedness and local capacity in responding to disaster risks. KSB positions the community not merely as disaster victims, but as active actors in disaster management across pre-disaster, emergency response, and post-disaster phases.

However, the implementation of disaster management at the community level still faces various challenges, particularly in disaster information management. Existing systems tend to be bureaucratic, top-down, fragmented, and technocentric, resulting in delays in information flow, weak coordination among volunteers, and limited community participation in disaster data management. In many cases, communities only function as information providers, while decision-making and information control remain dominated by formal institutions. These conditions create information gaps at the grassroots level and weaken the responsiveness of community-based disaster management systems.

Previous studies on disaster information systems have

largely focused on administrative efficiency and institutional management. Yanuarti and Sarwindah (2018), for example, developed a disaster information system using the *Framework for the Application of System Thinking* (FAST) to digitize disaster administration processes. Similarly, Ummal and Wicaksana (2020) designed a disaster logistics management system using *Business Process Modeling Notation* (BPMN) to improve aid distribution mechanisms. Although these studies contributed to improving institutional efficiency, the resulting systems remained centralized and less participatory.

The use of digital technology in disaster management has also developed through Geographic Information Systems (GIS), Android-based reporting applications, and real-time disaster reporting platforms (Supriyono et al., 2018; Pradhana, 2020; Ardhana, 2022). Nevertheless, community participation within these systems is often limited to reporting incidents, while data management, coordination, and decision-making processes remain controlled by authorities. This indicates that disaster information systems are still dominated by technocratic approaches rather than community empowerment perspectives.

From a social work perspective, disaster management should not only focus on technical response mechanisms but also on strengthening community capacity, participation, empowerment, and social resilience. *Strengths Perspective* emphasizes that communities possess capacities, local knowledge, social solidarity, leadership, and collective resources that can be mobilized to address social problems, including disasters (Saleebey, 1992). Similarly, empowerment theory highlights the importance of increasing community control over resources, decisions, and social processes affecting their lives (Rappaport, 1987). These perspectives are closely aligned with *Community-Based Disaster Risk Management* (CBDRM), which positions communities as the central actors in disaster risk reduction.

In the context of KSB, strengthening community resilience cannot rely solely on internal community capacities. The effectiveness of community-based disaster management is also influenced by local leadership support, inter-agency

communication, stakeholder coordination, and linkages between communities and disaster management institutions. Therefore, participatory disaster information systems should not only function as technological tools, but also as instruments for strengthening community empowerment, collaboration, and collective resilience.

This study aims to formulate a strategy for strengthening *Kampung Siaga Bencana* through the development of a Participatory Disaster Information System (*Sistem Informasi Partisipatif/SIP*) in Ujungberung District, Bandung City. Using a *Participatory Action Research* (PAR) approach facilitated through the *Technology of Participation* (ToP) method, this study involves KSB volunteers as co-researchers in identifying problems, designing interventions, implementing actions, and conducting collective reflection. The novelty of this study lies in integrating social work approaches, strengths perspective, community empowerment, and digital transformation into a participatory disaster information system model that strengthens local preparedness, participation, and sustainable community resilience.

Methodology

This study employed a qualitative approach using Participatory Action Research (PAR) to formulate a strategy for strengthening *Kampung Siaga Bencana* (KSB) through the development of a Participatory Disaster Information System (*Sistem Informasi Partisipatif/SIP*) in Ujungberung District, Bandung City. PAR was selected because it emphasizes collaborative knowledge production and active community involvement in identifying problems, designing actions, implementing interventions, and conducting collective reflection (Kemmis et al., 2014). In this study, KSB volunteers were positioned not merely as research subjects but as co-researchers who actively participated throughout the research process.

The participatory process was facilitated using the *Technology of Participation* (ToP) method, particularly through Focused Conversation (ORID) and Consensus Workshop techniques. These methods enabled participants to collectively identify disaster information management problems, evaluate the

limitations of the previous system (*SIGERCEP*), formulate community needs, and develop participatory solutions for disaster information management. The use of ToP strengthened dialogue, collective reflection, and collaborative decision-making within the community.

The study was conducted at KSB Ujungberung Bersatu, Bandung City, as one of the community-based disaster preparedness groups actively involved in disaster risk reduction activities. Informants were selected purposively based on their direct involvement in disaster management activities and the development of the information system. The participants consisted of KSB volunteers, community leaders, local government representatives, social facilitators, and stakeholders involved in disaster management coordination.

Data were collected through in-depth interviews, participant observation, Focus Group Discussions (FGDs), and documentation studies. Interviews were conducted to explore participants' experiences, perceptions, and challenges related to disaster information management and community participation. Participant observation was carried out during meetings, simulations, emergency response activities, and the implementation of the SIP platform. Documentation studies included organizational documents, disaster reports, activity records, meeting notes, and system development documents.

Data analysis employed the Miles and Huberman interactive model, consisting of data reduction, data display, and conclusion drawing/verification (Miles et al., 2014). The analysis was conducted continuously throughout the PAR cycle to identify emerging themes, community needs, participatory dynamics, and changes occurring during the intervention process.

To ensure trustworthiness, this study applied source triangulation, technique triangulation, and member checking. Source triangulation was conducted by comparing information obtained from volunteers, community leaders, facilitators, and institutional stakeholders. Technique triangulation involved comparing findings from interviews, observations, FGDs, and documentation. Member checking was conducted to confirm the accuracy of interpretations and findings with participants. The study also applied credibility, transferability, dependability, and

confirmability criteria to maintain qualitative research rigor (Creswell & Poth, 2018).

The PAR process in this study consisted of four main stages: problem identification, participatory planning, action implementation, and reflective evaluation. Through these stages, the study not only generated empirical findings regarding community-based disaster information systems but also produced a practical intervention model for strengthening KSB through participatory digital transformation.

Result and Discussion

This strategy of Kampung Siaga Bencana (KSB) through the development of a Participatory Information System (Sistem Informasi Partisipatif/SIP) in Ujungberung District, Bandung City. The findings indicate that disaster information management at the community level remains constrained by fragmented reporting systems, weak coordination among volunteers, delayed emergency information flow, and limited community participation in disaster data management. These conditions demonstrate the urgent need for a participatory and community-based disaster information system.

Table 1. Main Problems in Disaster Information Management at Community Level

No	Identified Problems	Findings
1	Fragmented information system	Disaster data were not integrated across disaster phases
2	Weak volunteer coordination	Communication among KSB members remained manual and unstructured
3	Delayed emergency reporting	Reporting procedures were hierarchical and time-consuming
4	Limited community participation	Residents were not actively involved in disaster data management
5	Lack of volunteer database	Volunteer competencies and capacities were not systematically mapped

Source: Research Processed

The findings reveal that disaster information management at the community level was still dominated by hierarchical and bureaucratic communication patterns. Information exchange among volunteers relied heavily on manual coordination

through personal communication, which often resulted in delays during emergency situations. In addition, disaster data were not systematically integrated across pre-disaster, emergency response, and post-disaster phases, causing difficulties in decision-making and coordination among stakeholders.

The Participatory Action Research (PAR) process facilitated through the Technology of Participation (ToP) method enabled community members and KSB volunteers to collectively identify strategic problems and formulate participatory solutions. Through Focus Group Discussions (FGD), participatory mapping, interviews, and reflective sessions, the study identified five fundamental community needs regarding the development of SIP Kebencanaan.

Table 2. Community Needs in the Development of SIP Kebencanaan

No	Community Needs	Description
1	Integrated disaster data	Integration across pre-disaster, emergency response, and post-disaster phases
2	Smartphone-based reporting	Real-time reporting with photo, video, and location documentation
3	Volunteer competency database	Mapping volunteer skills for tactical mobilization
4	User-friendly interface	Simplified application design for varying digital literacy levels
5	Clear managerial structure	Designated operators responsible for system management

The findings indicate that community members expected a disaster information system capable of facilitating rapid communication, integrating local disaster data, strengthening coordination among volunteers, and increasing community participation in disaster risk management.

The action phase of the study was implemented through the transformation of the initial communication system (SIGERCEP) into a participatory digital platform known as SIP Kebencanaan. The platform integrated several features,

including rapid disaster reporting, local risk mapping, volunteer databases, emergency communication channels, and disaster coordination mechanisms.

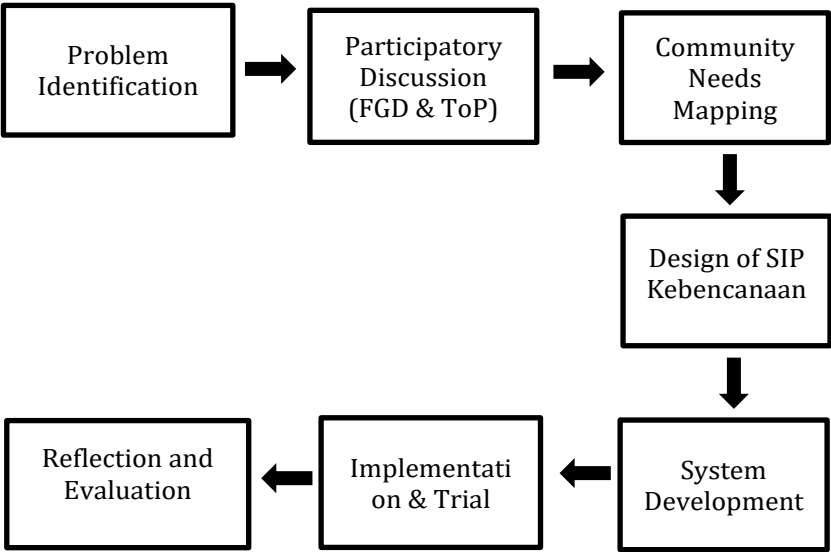


Figure 1. Participatory Development Process of SIP Kebencanaan

The PAR cycle demonstrates that community participation was involved throughout the entire process, beginning from problem identification to system evaluation. This participatory mechanism strengthened collective ownership and encouraged collaborative decision-making among KSB members and residents.

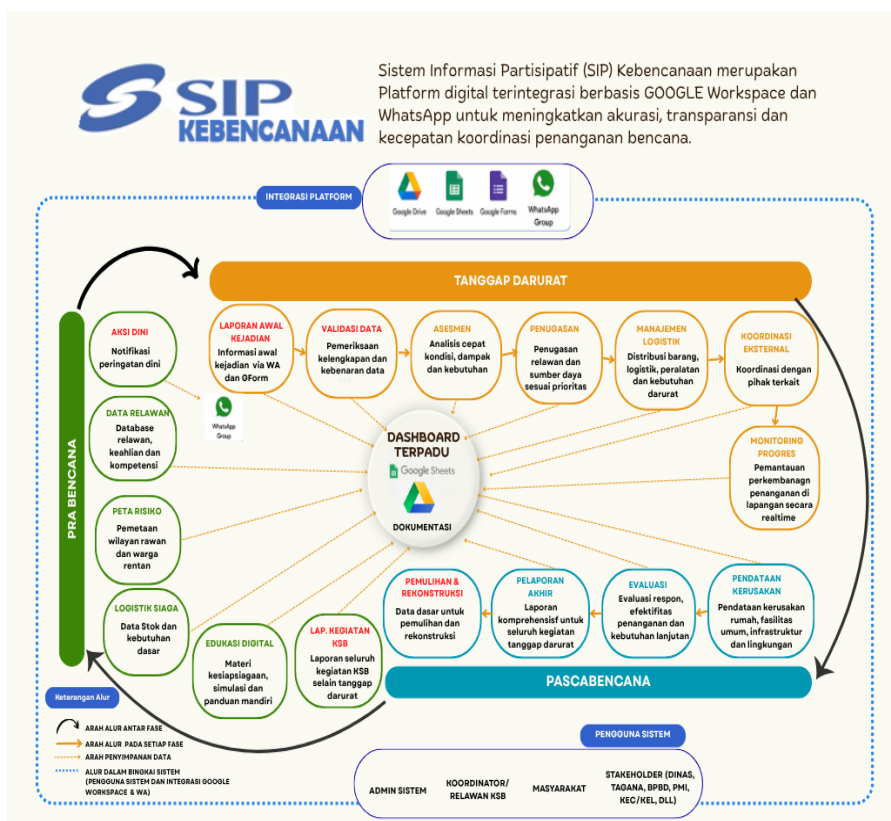


Figure 2. Design of SIP Kebencanaan

Figure 2 illustrates the conceptual design of SIP Kebencanaan as a participatory disaster information platform integrating rapid reporting, disaster databases, volunteer management, and emergency communication systems.

The implementation of SIP Kebencanaan significantly improved disaster information management and emergency coordination within KSB. Volunteers reported faster communication flows, improved accessibility of disaster information, and more effective coordination during emergencies. Furthermore, community participation increased because residents became directly involved in documenting local risks and reporting disaster situations.

Table 3. Comparative Conditions Before and After *SIP Kebencanaan*

Aspect	Before SIP	After SIP
Information flow	Slow and hierarchical	Faster and real-time
Volunteer coordination	Manual communication	Integrated digital coordination
Community participation	Limited	Increased community involvement
Disaster data management	Fragmented	Integrated and systematic
Emergency response	Delayed	More responsive and coordinated

The comparative improvement after the implementation of *SIP Kebencanaan* is illustrated in the following diagram.



Figure 3. Impact of *SIP Kebencanaan* Implementation

The development of *SIP Kebencanaan* not only improved technical disaster management but also strengthened social dimensions within the community. The participatory process increased sense of ownership, empowerment, collective responsibility, and community resilience among KSB members and residents.

To assess the feasibility and relevance of the developed model, expert judgment validation was conducted involving academics, disaster practitioners, and social work experts. The validation process evaluated system relevance, participatory integration, usability, disaster management integration, and sustainability aspects.

Table 4. Expert Judgment Validation Results

Assessment Aspect	Score (%)	Category
System relevance to community needs	92%	Very Feasible
Participatory approach integration	95%	Very Feasible
User-friendly application design	88%	Feasible
Disaster management integration	90%	Very Feasible
Sustainability and implementation potential	91%	Very Feasible
Average Score	91.2%	Very Feasible

Source: Research Processed

The expert judgment results indicate that *SIP Kebencanaan* is considered highly feasible for implementation in community-based disaster management. Experts emphasized that the integration of participatory principles, community empowerment, social work intervention, and digital transformation represents a significant innovation in strengthening local disaster resilience systems.

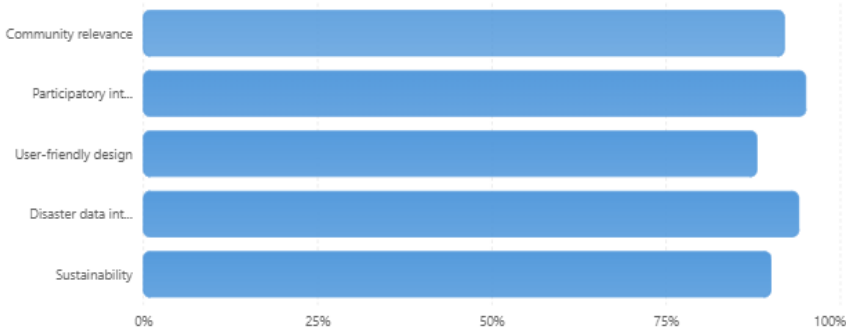


Figure 4. Expert Judgment Validation Diagram

The study also found that successful strengthening of KSB was influenced not only by internal community capacities but also by external supporting factors, including local leadership support, cross-institutional communication, stakeholder

coordination, government involvement, and collaboration with disaster management agencies.

Table 5. Supporting Factors in SIP Kebencanaan Development

Supporting Factors	Contributions
Local leadership	Encouraged volunteer participation
Government support	Facilitated coordination and legitimacy
Cross-sector communication	Improved information exchange
Community participation	Increased local ownership
Institutional collaboration	Strengthened disaster response networks

Source: Research Processed

The findings suggest that community resilience cannot rely solely on internal community capacity but requires collaborative governance involving multiple stakeholders. The existence of institutional support and cross-sector collaboration strengthened the sustainability of participatory disaster management at the local level.

From a social work perspective, these findings reflect the integration of community empowerment, strengths perspective, participatory governance, and digital transformation in community-based disaster risk reduction. Community members were positioned not merely as disaster victims or beneficiaries but as active agents involved in identifying problems, developing solutions, and managing disaster risks collectively.

These findings align with Chambers (1995) and Kabeer (2001), who emphasize that empowerment involves expanding community capacities to control resources and decisions affecting their lives. The development of SIP Kebencanaan strengthened local capacities through collective participation, collaborative decision-making, and the utilization of community assets and local knowledge.

The novelty of this study lies in the development of a participatory disaster information system model integrating social work intervention, community empowerment, strengths

perspective, and digital transformation within community-based disaster risk reduction. Unlike conventional disaster information systems that are centralized and technocratic, SIP Kebencanaan emphasizes meaningful participation, local ownership, collaborative governance, and sustainable community resilience.

Conclusion

This study found that disaster information management within Kampung Siaga Bencana (KSB) in Ujungberung District remained constrained by fragmented systems, weak volunteer coordination, delayed emergency communication, and limited community participation. These conditions demonstrated the urgent need for a participatory and community-based disaster information system.

Through the Participatory Action Research (PAR) approach facilitated by the Technology of Participation (ToP) method, the study successfully identified fundamental community needs related to integrated disaster data, rapid smartphone-based reporting, volunteer competency databases, user-friendly application design, and clear managerial structures. These needs became the foundation for the development of SIP Kebencanaan as a participatory digital platform for community-based disaster management.

The findings indicate that the implementation of SIP Kebencanaan significantly improved disaster information management, emergency coordination, and community participation. In addition, the participatory process strengthened sense of ownership, empowerment, collective responsibility, and community resilience among KSB members and residents. The study also found that community resilience strengthening was influenced not only by internal community capacities but also by local leadership support, cross-institutional communication, stakeholder coordination, and collaboration with government and disaster management agencies.

The novelty of this study lies in the integration of social work intervention, strengths perspective, community empowerment, and digital transformation within a

participatory disaster information system model. The study demonstrates that participatory digital transformation can become an effective strategy for strengthening Kampung Siaga Bencana and promoting sustainable community resilience in disaster-prone urban areas.

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