

A Synergetic Communication Model of Decision Making on Mount Sinabung Eruption Contingency Plan

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Abstract— *This research paper aims to find a synergetic communication model in the formulation of the Regent's regulatory policy on the Mount Sinabung eruption contingency plan. This study was conducted with descriptive qualitative methods, the data collection techniques were through interviews, observations, and documentation related to the rule of the Karo Villagers on the Mount Sinabung eruption contingency plan. Research results are in the form of a communication process model in the proposal, decision-making process, and policy on the contingency plan of the eruption of Mount. Sinabung in North Sumatra. The contribution of this research is a new model in the policy formulation of the Mount Sinabung eruption contingency plan.*

Keywords— *disaster communication model, contingency plan policy, Sinabung*

INTRODUCTION

Based on the research of Lestari at 2016 that Sinabung disaster management has not been optimal because the local government of Karo regency did not have a document contingency plan as a reference. According to article 5 of the Law, number 24/2007 [1] on disaster management mentions that the responsibility in organizing disaster management is the government and local governments. Disaster management in the stage of pre disaster done in the situation when disaster not happen, and where there is a potential disaster. Article 5 of paragraph 1a of government regulation number 21/2008 [2] on disaster management states that in situations with no disaster occurs, one of the implementations of disaster prevention is making the plan of the disaster prevention itself. In article 17, paragraph 3 of government Regulation number 21/2008 states that in case of disaster mitigation plan can be supplemented by preparation of a contingency plan.

Related to the Contingency Plan research, Basyid [3] has investigated the development of the Lokon Volcanic Disaster Contingency Plan map. The results of the study states that the Lokon Volcano Contingency Plan map can provide information to deal with disasters and predict the impact of the disasters of the Volcano eruption and interpreting the dimensions of eruption columns [4]. Contingency plan is an important factor, focus on service time [5], budget allocations [6], distribution center [7], complex planning and management problems [8] in disaster preparedness including

the Mount Sinabung Eruption, there is about Facility location optimization model for emergency humanitarian logistics [9].

Factors affecting the implementation of disaster mitigation policies of Mount Sinabung based on the research findings of Kristian [10], findings are communication factors, information, and transmission that do not guarantee that the implementation is going well. Communication factors that had fulfilled without being supported by the implementor disposition, make the policy does not work. In handling the disaster of the eruption of Mount Sinabung, it is necessary to remember that disaster handling demands a rapid response.

Research on disaster management policy is conducted by Hidayah [11] about The Disaster Management Policy in The Regional Autonomy Era explained about Lapindo Brantas mud overflow in Porong Sidoarjo. The difficulty in integrating the policy is due to the complexity of the policy that must synergize. Other complexities revealed to be related to the issues are caused by the unsynchronized relations between the contents of these policies and the level of cultural policies (preconception, attitude, behavior, knowledge and performance) [12] at the community and policymakers.

Londok research [13] involves two primary variables, namely 1). Success implementation of disaster management policy as a dependent variable that is given the symbol Y; 2). The suspected factors in determining the successful implementation of disaster management policies, such as factors of communication, resources, disposition, and bureaucratic structure as an independent variable that given X symbol.

The research was instituted by Rahman [14] about Banjarnegara Region Capacity in the landslide disaster management, explaining that the regional capacity in the implementation of disaster management is an important parameter to determine the success for disaster risk reduction.

Hutahaean [15] examines the analysis of disaster management policy, explaining that judging from the policy aspect that the model formulate the PB Law is a combination of the group and incremental model. Group Model is a groups in the community that conduct the initiative of the formulation of problem structuring, forecasting, alternative policies (academic manuscripts), and brings this problem (disaster) to the government agenda or legislative.

Meanwhile, incremental models prioritize repetitive actions with just a little change. This action is due to the fear of risk.

The novelty of this research is the findings on the model of communication in the process of contingency plan policy making that is an essential aspect in the prevention of the ongoing eruption of Mount Sinabung. This model refers to a simple rational model in Fig. 1.

The Model of communication in policy-making is through (1) the process of identification of problems on the inadequacy of policy on the contingency plan as a basis for disaster management of Mount Sinabung eruption. (2) The selection of Choose the criteria to evaluate the problem to go to the troubleshooting options. The criteria specified are the parties responsible for reducing the risk of disaster eruption Mount Sinabung. (3) The hoice or alternative policy in the form of policy for risk reduction within a radius of 10 km.

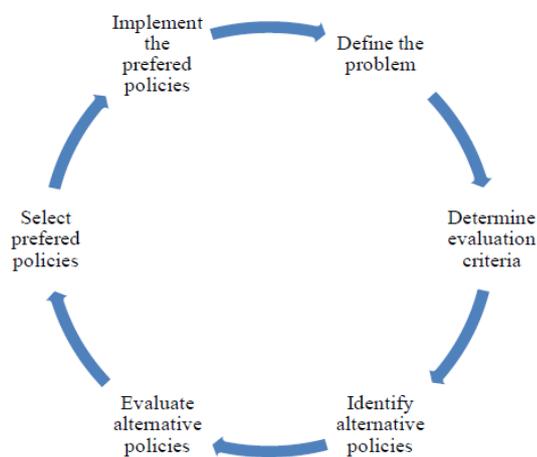


Fig. 1. Simple Rational Model of Patton-Savicky [16]

(4) The assessment of all such alternatives, including providing the weights and ranks of each alternative that some affected sub-districts had done such as the alternative to empty the houses. (5) The production of the best alternative then chosen as a decision or policy. The alternative is to propose a document contingency plan to local regulation. (6) The policy implementation under the basic technical procedures that need to do in order to make the policy become the best policy. Given with the local regulations on the contingency plan of Mount Sinabung eruption which are proposed to be the Regent's rule, the policy implementation have not conducted. This new research phase is simulating the implementation of contingency plan policy.

LITERATURE REVIEW

This research is based on article 1 (9) of LAW 24/2007 about disaster management, primarily on disaster mitigation. Disaster mitigation is defined as "an effort to reduce disaster risk, both through physical development or awareness and skill enhancement of disaster-facing threats." Based on the understanding of the provisions of the article, Puji Lestari [17] defines a model of effective disaster communication as a model of proper and accurate communication in resolving disaster problems that are form of a policy determination process model are a regent regulatory plot on the Mount Sinabung eruption contingency plan.

As a theoretical reference to the unification between the disaster communication model and the public policy cycle, the author chooses a Cycle Theory of David Easton [18]. In summary, the cycle theory is a process model of a simplified public policy initiated by Lasswell. Lasswell suggests that the policy process consists of seven stages, namely, intelligence, promotion, formulation, exclamation, application, termination, and assessment. The Model has succeeded as a basic framework for policy studies and become the starting point of various typologies of policy processes despite the conflict that happens: The termination phase precedes the assessment. After that, the policy studies have experienced developments, and until today, the depiction of the policy process more commonly known through the preparation of agendas, policy formulation, decision making, implementation, and evaluation. The evaluation here is to encourage termination of the policy.

Faturahman [19] in an analysis of the contribution input-output model contributes to further differentiation of the policy process. Explicitly, when the decision wants to adopt a specific disaster mitigation action, then the focus of the mitigation action should be further expanded including implementation/mitigation action, disaster-affected group reaction and broader impact for example on other social sectors.

This research also refers to the two-image policy cycle consisting of policy formulation, implementation, monitoring, and evaluation. Policy on formulation of a policy on contingency planning is implemented in Karo regency that requires the monitoring and evaluation process.

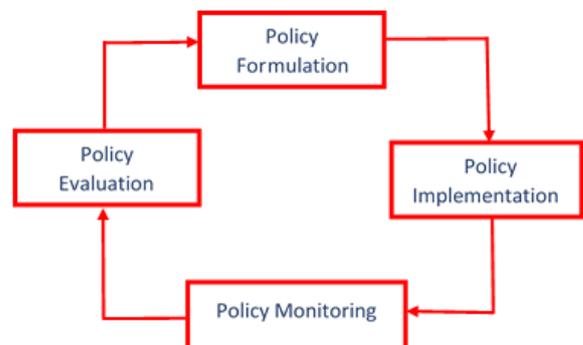


Fig. 2. Policy Cycles [20]

Policy-making processes begin with the formulation and adoption of policies include; Goal-setting – what to accomplish with policy – and alternative consideration of different actions, to improve governance practices and more rational decision-making tools. [21].

The research also bases on the concept of policy cycles [22]. The cycle explains the model of policymaking processes as a sequential process, i.e., policies developed based on the logical process of the problem. There are various approaches to understand policy cycles, among other rationalists 'stage' models which have become the dominant model for creating a policy cycle concept.

The stage model of the policy cycle is commonly used as an instruction tool, outlines the steps to be taken by policymakers to develop a reliable and evidence-based policy result with broad applications across all of the political system. The stage model in Fig. 3 explains (1) Identification

of problems and organizations of identified issues that capture the attention of governments and broader communities that require governmental action. (2) Policy analysis-the problems researched and analyzed to inform the policy decisions, often done by the executive branches of the government. (3) Development of policy instruments-policy instruments designed or selected based on the most reasonable means to achieve the desired outcome. (4) Consultation held with various actors, including the wider community. (5) Coordination – once set up, the cross-government coordinated policy to obtain funding and to ensure consistency with other existing policies. (6) Decision-one or more options that are debated and examined are decided by ministers, cabinets, or other actors in government. (7) Implementation-policies then implemented by public or other sectors, agencies, or external organizations. (8) Evaluation-once the policy is applied, the evaluation is done to determine the effectiveness of the policy and to decide what action to follow [22].

Communication elements in the model is found at point 5 in the form of coordination of preparation and implementation of policies made. The success of coordination is very related to policy analysis. Policy Analysis is a planned effort relating to explanation and prescription or recommendation on the consequences of public policy that applied [23]. In addition, the local communities have already established their local groups and then these groups function to deal with the policy [32].

This research is focused on the policy on Mount Sinabung eruption contingency plan, which requires a lengthy planning process. Planning is the tools used to ensure a better future. In the context of disaster risk, a better future is characterized by readiness for a disaster, the ability to minimize disaster impact, and the ability to recover well, whether it is for the social entity or a system. One of the planning instruments to ensure a better future in facing various catastrophic risks is what is called as contingency planning.

The drafting scenario with contingency planning in a region is based on the regulation of the governor and local regulations (regency or city). *Perka*. Corresponding to the *Perka* and to the BPNB. No. 4/2010. Legal bases in contingency planning for the preparation of the contingency plan, are Law Number .24/2007, Law Number 23/2014, Law Number 25/2004, Government Regulation Number 58 Year 2005, Government Regulation Number 41/2007, Government Regulation RI Number 22/2008, Government Regulation Number 23/2008, Head of BPBD Regulation Number 3/2008, Head of BPBD Regulation Number 4/2008, Head of BPBD Regulation Number 10/2008, Head of BPBD Regulation Number 1/2008, and Regulation of the Minister of Home Affairs Number 54/2010 about The Implementation Local Government Regulation Number 8/2008.

METHODOLOGY

This research used qualitative descriptive methods in the communication model. The research location was in Karo Regency, North Sumatera. Research time was from April to May 2019. The research subject were Regent, vice- Regent, Head of BPBD, and Head of Law of Karo Regency. The object of this research was the communication in the process of making a contingency plan of Mount Sinabung eruption. Data collection techniques used in-depth interviews on basic

related research subjects and the process of communication in contingency plan policy retrieval. Observations were conducted in the Karo regency, especially in BPBD and the legal section. Documentation was obtained from various rules regarding contingency plan policy retrieval. A limited discussion conducted in Karo regency involving related parties in the process of communication planning and the making of contingency plan policy, such as BPBD, legal department, and several related agencies. Data analysis techniques were conducted with qualitative analysis of the collected data using the following stages [24]: (1) Data reduction, from which was the analysis of data directs, classifies, sharpens and removes data that are not need. (2) Data presentation, namely the existence of a collection of data compiled and allows the withdrawal of conclusions. (3) Withdrawal of conclusion, i.e., the results obtained can be used for action taking.

FINDINGS RESULTS AND ANALYSIS

Based on Karo Regency local regulations on regional disaster management, the Regional Disaster Management Agency (BPBD) of Karo District cooperated with UPN "Veteran" Yogyakarta in the creation of contingency plans and issued Regent Decree of Karo involving contingency planning. A joint meeting was conducted among BPBD, UPNVYK, and stakeholders (police, army, social service, etc.) to collect materials from drafting BPBD Karo contingency plan with UPN "Veteran" Yogyakarta. After the draft was completed, BPBD Karo proposed a draft contingency plan to Regent Karo. If a change is still made or not received, then the draft was revised by UPN "Veteran" Yogyakarta and was reexamined by the regent. Then, BPBD finalized contingency plans that have been approved by the regent with the relevant stakeholders. If the agreement has been given to the contingency plan, then BPBD proposes to the law section to be processed. The processing was raised to the Assistant, regency secretary, deputy Regent, and regent for the dissemination of contents. It returned to the law section for SKPD deliberations related to disaster management. After the completion, the Regent Decree is published on the rule of the regent on Mount Sinabung eruption contingency plan. BPBD Karo will socialize the contingency planning to SKPD, sub-district, and disaster-affected villages. Plans will be socialized in Sukatendel village.

Until this article is being written, there is no clarity of status regarding the contingency plan due to one of the conditions for doing contingency planning is PERDA or local regulations. *PERDA* Karo itself does not have a registration number from the province in order to be the legal basis. The registered *PERDA* Karo number is still in progress in the province until April.

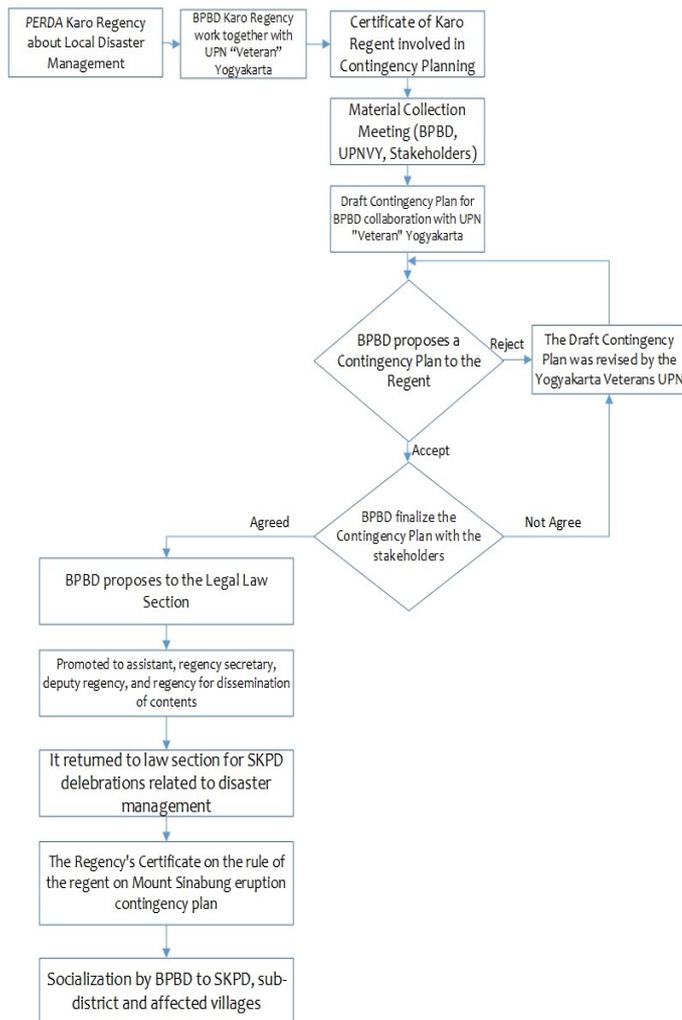


Fig. 3 Communication Model of the Regent's regulation on the contingency plan of Mount Sinabung eruption (Interview with BPBD and Head of Law Kabupaten Karo (May 8th, 2019))

In December it was proposed, and already inspected by the province, and then the province returned it to Karo regency to be repaired. Karo regency has already repaired and sent it back to the province. A few days ago, Karo District government checked how the status is, but it did not produce results because the provincial government was still "busy (not only a problem of *Perda* that must be handled by the province)." *Perda* itself has sanctioned, while struggle has no sanctions.

Analysis of decision-making regarding the Mount Sinabung eruption contingency plan is not separated from the group's communication aspects. More and more groups are involved and have the competence of problem-solving as well as the decision taken is increasingly effective. There are four functions of group communication, according to Hirokawa and Gouran [25] to be the basis of Functional Perspective on Group Decision Making Theory: (1) analyze the problem. The group knows the source of the problem and the risks that will occur if the problem is not resolved. Analysis of the problem in this study found that Karo regency is a disaster-prone area of Mount Sinabung eruption. Disaster risk reduction problems have not resolved optimally. The results of the interview with the Head of BPBD Karo Regency states that the main factor that is the cause is the absence of document contingency plan eruption of Sinabung as a

reference to decision making. In this regard, the study finds that the problem of Mount Sinabung eruption contingency plan should be resolved immediately. For such completion, the process of communication is required to decide on the policy of the contingency plan to rule the regent. (2) goal setting. Group members must determine the objectives to achieve, namely the reduction of disaster risk of Sinabung volcano eruption. In this study, the alternative taken is to communicate among members of the group with the facility of the College (Universitas Pembangunan Nasional "Veteran" Yogyakarta). Communication and coordination are carried out to perfect the document of Mount Sinabung eruption contingency plan that has been pre-established and has not set into the Regent rules. The defendant scenario contingency plans, objectives, technical and managerial measures, and the deployment of potential mutually agreed resources to prevent or to better cope with an emergency or critical situation. Plans are structured to face a crisis that is expected to occur soon, but it cannot happen. The contingency plan is not intended to develop a project, but it rather consists utilization efforts as much as possible of the resources/potential of the community available to deal with disasters/emergency. The Defendant contingency plan (UU, 24/2007; Article 35, and section 36. Perka BPNB. 4/2008 PP. 21/2008. Chapters 5 and 6) is about the importance of contingency planning in disaster risk reduction and it is updated periodically. Beside anticipating the types of disasters, people may face and know practically how to manage disasters when the disaster occurs [26]. Contingency planning is a management process that analyzes disaster risks and establishes arrangements in advance to enable timely, effective and appropriate responses [27]. (3) alternative identification, which is the process of drafting various alternatives that can be used to solve the problem. All members of the Regional Device Organization (OPD) in Karo regency offer solutions following the competencies in disaster risk reduction of Mount Sinabung eruption. For example, the commander of Military District Command is drafting a variety of disaster risk reduction alternatives through the provision of human resources (HR) and infrastructure needed for disaster risk reduction of Mount Sinabung eruption. Similarly, other OPD such as the Department of Communication and Information (KOMINFO) prepares the hardware and software for the provision of Media Center as a center for disaster information in Karo regency. (4) the evaluation of positive and negative characters. This evaluation is related to the possibility of Mount Sinabung eruption. The chosen decision must be held to be accountable to the community, especially those affected by the Mount Sinabung eruption. Communication in decision making about the actions taken must be carefully accountable according to the character of each group. In terms of disaster known as the responsibility, it means what has been formulated by the group members through the document of Mount Sinabung eruption contingency plan should be implemented according to the plan. If the group does not implement it, the public may make a lawsuit against the government regarding disaster risk reduction. In this final function, Hirokawa and Gouran remind that the group ignores documents that have become regional policy. The community needs to control and to remind the positive and negative impacts of each alternative.

This is where the group's communication role is when the group moves to achieve the purpose of communication can influence decision making. The group communication model in the decision-making process is found in this study, i.e., in Fig. 4.



Fig. 4. Communication Model The Synergy of Inter-group Decision-making regarding Contingency Plan of Sinabung Volcano (Research findings 2019 adapted from Pratiwi [16])

Communication Model of the Synergy of Intergroup decision-making about Mount Sinabung Eruption Contingency Plan. The finding of this research is a new model adapted from the simple rational decision-making model of Patton-Savicky by Pratiwi [16]. The difference of this model with the previous model includes elements of communication and coordination in the process of taking the synergy of the inter-group decision on Mount Sinabung eruption contingency plan. The previous model-oriented decision-making process was lacking communication elements involvement. According to the authors, the effective decision-making process of Mount Sinabung eruption contingency plan is highly dependent on the communication and coordination of the interactionists involved. The role of inter-group communication and coordination is the driving wheel of the decision-making process of defining the problem, determining evaluation criteria, identifying alternative policies, evaluating alternative policies, selecting preferred policies, and implementing the preferred policies. All processes running clockwise is not separated from intergroup communication and coordination elements.

The findings of this research can be compared with research findings [28] that discusses the formulation process of poverty alleviation policy: a case study of technical implementation Unit of poverty Alleviation (UPTPK) Sragen Regency, Central Java. The similarity of such research with this study is to discuss the formulation of policies. Another similarity is the process of determination of regent rules, namely the way of establishment of the Regent rules as a legal protection. Policy executor is appointed by the regent. The principle works to coordinate with the agency or the body that manages the budget. The Mount Sinabung eruption contingency plan of Karo Regency has problems with the legal basis of which there is no local regulation on disaster management. When the researchers interviewed the head of Karo Regency Law (8 May 2019), the new revised Perda was about disaster process in North Sumatra province. The difference is that the research discusses the formulation of policies on poverty alleviation in the regency of Sragen, that

has research on the policy of Mount Sinabung eruption contingency plan.

The policy on the Mount Sinabung eruption contingency plan is indispensable for disaster risk reduction. This is recognized by the Government assistant and welfare department of the Karo Regency Suang Karo-Karo, M. Sc. saying that in 2010 Karo Regency government and the people who have not had enough experience in handling a disaster, so many things cannot be maximally done. In this regard, Karo regency government needs assistance in facing the disaster of Sinabung volcano eruption. The findings of this research are strengthened by the statement of Head of the Implementation of BPBD Karo Regency, Ir. Martin Sitepu who expects input from the Universitas Pembangunan Nasional "Veteran" Yogyakarta and the participants present for the completion of contingency plan In facing Mount Sinabung eruption [29]. This document is immediately processed to be one of the policies of disaster risk reduction of the government of Karo regency precisely as rule of regent.

The findings of the communication model synergists of the inter-group decision-making regarding the Mount Sinabung eruption contingency plan, is supported by the research of Wijaya [30] on communication planning and strategy in development activities. Wijaya finds about the model of communication planning as an activity carried out throughout the program, and that becomes a functioning document that is always updated periodically based on the needs of society. The research supports the findings of this research that recognizes communication as an essential factor in the determination of the communication strategy. The communication scaffolding in this study is interpreted as planning to develop the policy of the Karo regional government regarding contingency plans of Mount Sinabung eruption.

This study finds that the process of formulation of Mount Sinabung eruption contingency plan policy has gone smoothly. The process of defining the problem, determining evaluation criteria, identifying alternative policies, evaluating alternative policies, and selecting preferred policies has started since 2017. The process involved all the regional government organizations of Karo regency related to disaster management led by the commander of Military District Command, representatives of religious groups, local government companies and Universitas Pembangunan Nasional "Veteran" Yogyakarta. The process has not resulted in a legitimate contingency plan policy as a government regulation for experiencing various constraints. The main obstacle is the lack of coordination among parties related to the formulation of government regulatory policy. Another obstacle found is the absence of the legal basis of the local regulation on disaster management. The finding of the research interview with the head of regional regulation on disaster management are the processes of repairing done by the regional government of Karo involving the People's Representative Council of North Sumatra Karo Regency, Indonesia.

Researchers find other factors that have become an obstacle in the process of validation of the local regulation policy, which is the performance factor of employees who are less concerned about the essential aspects of disaster communication. This is evident in the process of filing the

protracted regional regulation that has not been resolved, whereas Karo regency is a disaster-prone area of Gunung Sinabung eruption with the status of being active until May 2019. According to the analysis of researchers, all parties related to decision-making about the local regulation on disaster should realize the importance of the regulation that should immediately target for disaster risk reduction. Based on the results of interviews with the head of Law of Karo regency, the decision-making process is underway. The result of the research evaluation is that the decision-making process will go smoothly when the communication and coordination of the regional leadership with the House of Representatives take place well following the model of Fig. 4 findings.

This study contributes in the form of policy recommendation to Karo Regency government related to the coordination process and communication synergy between a local government organization and the Community for disaster risk reduction of mountain eruption Sinabung. This is according to the mandate of Law No. 24/2007 [1] on disaster management stating that the responsibility in organizing disaster management is for government and local governments. *BPBD* helps local government in this case. Regional disaster management Agency should immediately conduct the communication and coordination process in order to make the decision to prioritize the document contingency plan as regional regulation of Karo regency. Coordination for good disaster risk reduction includes; (1) Management of functional disaster prevention problems; (2) The existence of a clear purpose, role and responsibility of the Organization; (3) Resources and timing that will make the coordination run; (4) The course of coordination based on the exchange of information from various sources of different information [31]. It is based on the importance of the document to be a reference if there is a disaster eruption Mount Sinabung. This recommendation is also based on the current situation of Mount Sinabung with an active status until May 2019. Disaster risk reduction is a priority for Governments to prepare communities for a severe disaster. Disaster-resilient communities can reduce disaster risk.

CONCLUSION AND RECOMMENDATION

This study has found a model of communication on decision-making synergy about the policy of Mount Sinabung eruption contingency plan. Decision-making involves synergistic communication among all stakeholders reducing disaster risk of Mount Sinabung from defining the problem, determining evaluation criteria, identifying alternative policies, evaluating alternative policies, selecting preferred policies, and implementing the preferred policies. Synergistic communication is reflected in the effective communication and coordination between stakeholders, fast feedback, trust, honesty, and high creativity to create a resilient and safe society from the danger of eruption of Mount Sinabung.

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REFERENCES

- [1] Presiden Republik Indonesia, *Undang-undang Republik Indonesia Nomor 24 Tahun 2007 tentang Penanggulangan Bencana*. Jakarta, 2007.
- [2] P. Indonesia, *Peraturan Pemerintah Republik Indonesia Nomor 21 Tahun 2008 Tentang Penyelenggaraan Penanggulangan Bencana*. Jakarta, 2008.
- [3] M. A. Basyid, "Pengembangan Peta Rencana Kontijensi Bencana Gunung Api Studi Kasus: Gunung Api Lokon," *J. Rekayasa*, vol. XIV, no. 4, pp. 216–226, 2010.
- [4] R. Sparks, "The dimensions and dynamics of volcanic eruption columns," *Bull. Volcano*, vol. 48, no. 1, pp. 3–15, 1986.
- [5] A. Campbell, D. Vandenbussche, and W. Hermann, "Routing for Relief Efforts," *Transp. Sci.*, vol. 42, no. 2, 2008.
- [6] J. Salmero and A. Apte, "Stochastic Optimization for Natural Disaster Asset Prepositioning Stochastic Optimization for Natural Disaster Asset Prepositioning," *Prod. Oper. Manag.*, vol. 19, no. 5, pp. 561–575, 2010.
- [7] B. Balci and B. M. Beamon, "Facility location in humanitarian relief," *Int. J. Logist. Appl. - INT J LOGIST-RES APPL*, vol. 11, no. 2, pp. 101–121, 2008.
- [8] J. Cole *et al.*, "GIS-Based Emergency and Evacuation Planning for Volcanic Hazards in New Zealand," *Bull. New Zeal. Soc. Earthq. Eng.*, vol. 38, no. 3, 2005.
- [9] C. Boonmee, M. Arimura, and T. Asada, "Location and Allocation Optimization for Integrated Decisions on Post-Disaster Waste Supply Chain Management: On-site and Off-site Separation for Recyclable Materials," *Int. J. Disaster Risk Reduct.*, vol. 31, 2018.
- [10] R. Kristian, "Faktor-Faktor Penghambat Implementasi Kebijakan Penanggulangan Bencana Erupsi Gunung Sinabung," *Talent. Conf. Ser. Local Wisdom, Soc. Arts*, vol. 1, no. 1, pp. 099–103, 2018.
- [11] K. Hidayah, "KEBIJAKAN PENANGGULANGAN BENCANA DI ERA OTONOMI DAERAH (Kajian Terhadap Penanganan Kasus Luapan Lumpur Lapindo Brantas)," *J. Borneo Adm.*, vol. 11, no. 3, pp. 298–315, 2015.
- [12] Tuswadi and T. Hayashi, "Disaster Prevention Education in Merapi Volcano Area Primary Schools: Focusing on Students' Perception and Teachers' Performance," *Procedia Environ. Sci.*, vol. 20, pp. 668–677, 2014.
- [13] C. I. Londok, "IMPLEMENTASI KEBIJAKAN PENANGGULANGAN BENCANA (Suatu Studi Di Badan Penanggulangan Bencana Daerah Kabupaten Minahasa Tenggara)," *J. Adm. Publik*, vol. 2, no. 001, pp. 1–12, 2014.
- [14] A. Z. Rahman, "Kapasitas Daerah Banjarnegara dalam Penanggulangan Bencana Alam Tanah Longsor," *J. Ilmu Sos.*, vol. 16, no. 1, pp. 1–8, 2017.
- [15] M. Hutahaean, "Analisis Kebijakan Penanggulangan Illegal," *J. Penanggulangan Bencana dan Pengemb. Masy.*, vol. 01, no. 01, pp. 1–5, 2009.
- [16] S. E. Pratiwi, "Formulasi Kebijakan Pemerintah Kabupaten Jombang dalam Pengendalian Alih Fungsi Lahan Pertanian," pp. 1–7, 2013.
- [17] P. Lestari, *Komunikasi Bencana: Aspek Penting Pengurangan Risiko Bencana*. Yogyakarta: PT. Kanisius, 2018.
- [18] F. Fischer, *Handbook Analisis Kebijakan Publik: Teori, Politik dan Metode*. Bandung: Penerbit Nusamedia, 2015.
- [19] B. M. Faturahman, "Konseptualisasi Mitigasi Bencana Melalui Perspektif Kebijakan Publik," *PUBLISIA J. Ilmu Adm. Publik*, vol. 3, no. 2, pp. 122–134, 2018.
- [20] M. F. Imansyah, "Studi Umum Permasalahan dan Solusi Das Citarum Serta Analisis Kebijakan Pemerintah," *J. Sositoknologi*, vol. 25, no. 11, pp. 17–31, 2012.
- [21] I. Sutiarsa, Y. Warella, and S. Sulandari, "Implementasi Program Pengembangan Kecamatan (PPK) di Kecamatan Tempuran Kabupaten Malang," *J. Ilmu Adm. dan Kebijak. Publik*, vol. 3, no. 1, pp. 98–124, 2010.
- [22] E. Blomkamp, M. N. Sholikhin, F. Nursyamsi, J. M. Lewis, and T.

- Toumbourou, "Understanding Policy Making in Indonesia: in Search of a Policy Cycle," no. June, pp. 1–45, 2017.
- [23] S. Arifin, "Model Kebijakan Mitigasi Bencana Alam Bagi Difabel (Studi Kasus di Kabupaten Bantul, Yogyakarta)," *J. Penelit. Pengabd. DPPM UII*, pp. 3–18, 2008.
- [24] U. Ali, "Teknik Pengumpulan dan Analisis Data Kualitatif," *pengertianpakar.com*, 2015. [Online]. Available: <http://www.pengertianpakar.com/2015/05/teknik-pengumpulan-dan-analisis-data-kualitatif.html>. [Accessed: 10-Jan-2019].
- [25] K. Arofah, "Komunikasi Kelompok dan Eksternalisasi Pengetahuan Tacit Dalam Pengambilan Keputusan Organisasi," *J. Ilmu Komun.*, vol. 11, no. 1, pp. 30–43, 2013.
- [26] Séraphine MUKANTABANA, *REPUBLIC OF RWANDA MINISTRY OF DISASTER MANAGEMENT AND REFUGEE AFFAIRS (MIDIMAR)*, no. April. 2014, pp. 1–24.
- [27] UNISDR, *Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction*, vol. 41, no. December. 2016, pp. 1–41.
- [28] I. A. Nugraha, "PROSES FORMULASI KEBIJAKAN PENANGGULANGAN KEMISKINAN: Studi kasus Unit Pelaksana Teknis Penanggulangan Kemiskinan Kabupaten Sragen," *Politika: Jurnal Ilmu Politik*, vol. 8, no. 2, p. 19, 2018.
- [29] Karokab, "UPN 'Veteran' Yogyakarta Adakan Publik dan Simulasi Gladi Posko Dokumen Rencana Kontinjensi Menghadapi Erupsi Gunung Sinabung," *karokab.go.id*, 2019. [Online]. Available: <https://karokab.go.id/id/berita/7839-upn-veteran-yogyakarta-adakan-uji-publik-dan-simulasi-gladi-posko-dokumen-rencana-kontinjensi-menghadapi-erupsi-gunung-sinabung>. [Accessed: 29-May-2019].
- [30] I. S. Wijaya, "Perencanaan dan strategi komunikasi dalam kegiatan pembangunan," *Lentera*, vol. XVIII, no. 1, pp. 53–61, 2015.
- [31] P. Lestari, A. Prabowo, and A. Wibawa, "Manajemen Komunikasi Bencana Saat Tanggap Darurat," *J. Ilmu Komun.*, vol. 10, no. 2, pp. 173–197, 2012.
- [32] Purnomo, E. P., Anand, P. B., & Choi, J. W. (2018). The complexity and consequences of the policy implementation dealing with sustainable ideas. *Journal of sustainable forestry*, 37(3), 270-285.
- [33] Purnomo, E. P., Ramdani, R., Agustiyara, Tomaro, Q. P. V., & Samidjo, G. S. (2019). Land ownership transformation before and after forest fires in Indonesian palm oil plantation areas. *Journal of Land Use Science*, 1-15.