LEGAL ASPECT OF THE COOPERATION ON TRIPLE HELIX MODELS IN MITIGATION ANAK KRAKATAU MOUNTAIN

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ABSTRACT

Mount Anak Krakatau (GAK) is an active volcano, potentially big for the occurrence of disaster. Therefore, geological mitigation efforts are required. Implementation of mitigation, as well as necessary; technology, policy, community participation, also require substantial funds. The solution to this is through cooperation between government, business and universities. However, it takes a legal umbrella to build mutually synergic and profitable cooperation, namely through a triple helix approach. This approach is considered appropriate to serve as a model to overcome the problems in mitigation. This study answers how the law regulates mitigation cooperation through a triple helix model.

Keywords: Triple Helix, Mitigation, Mount Anak Krakatau

1. PREFACE

1.1 Background Issues

The paradigm shift of disaster provides a new view of disaster management in Indonesia, from responsive to risk management, so this understanding will be a benchmark in recognizing what disaster risks are.[1]

Disaster in Law No. 24 of 2007 on Disaster Management, is defined as an event or series of events that threaten and disrupt the life and livelihoods of the community caused by both natural and / or non-natural factors and human factors resulting in the occurrence of human casualties , environmental damage, property loss, and psychological impact. Meanwhile, danger is an event of threatening events that can affect human life, livelihood assets and the environment, the dangers are always associated with disaster risk.[2]

In Lampung Province, there is a source of disaster, namely GAK which is an active volcano and at times can cause catastrophic disaster, as ever happened Krakatoa volcano eruption. Around GAK there are several islands, including Sebesi Island, Sebuku and Tiga Island are inhabited, in addition to the coastal community on the tip of Sumatra Island. The danger of a threatening disaster needs to be mitigated to reduce losses and casualties from disasters.

Mitigation according to C. Emdad Haque, is "... *as the wide array of actions that can be taken to reduce vulnerability*".[3] Mitigation is often not getting too much attention than preparedness, response, or recovery. [4] Mitigation of GAK form of physical structure should be done immediately in the form of installation of early detection tool to monitor the development of geological influence of the earth plate shift, so as soon as possible can be known and carried out efforts to save and reduce lava melt by making channels lava. The purpose of mitigation, is

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[1]Petrasawacana, *Kajian Teoritis Tentang Penanggulangan Bencana***,** June 26, 2011, in http://petrasawacana.wordpress.com/2011/06/26/kajian-teoritis-tentang-penanggulangan bencana, page. 1.

[2]Tim Penyusun, *Kajian Ilmiah Mitigasi Bencana Erupsi G. Anak Krakatau,* South Lampung Region, 2013.

[3]C. Emdad Haque, *Adaptation Options Strategies for Hazards And Vulnerability Mitigation: An International Perspective,* in Journal *Mitigation and Adaptation Strategies for Global Change* Volume 10: 3, July 2005), Netherlands: Springer, page. 3

[4]*Loc.Cit,* page. 175

reducing of possible risks, reducing of risk consequences, risk avoidance, risk acceptance, and transfer, distribution, or dissemination of risk.[5]

A problem with this mitigation activity is the installation of detection equipment and trenching for lava channels need big cost and feels heavy if only charged to the financing available in the local government. In addition, non-physical mitigation efforts, including education, extension, and community awareness, conducted through training, rehearsals, simulations, workshops and improving community preparedness on disaster risk reduction. Therefore, GAK disaster mitigation financing needs to be considered of all participation, especially the private sector in a mutually beneficial cooperation. Efforts to involve private parties are possible. only the private sector often see the activity from the point of profit to be gained, so that if the financing is done without providing a profitable economic effect, rarely the private sector will involve themselves from the activity.

One alternative that can be assessed in the involvement of private parties is the utilization and management of mineral resources in the form of sea sand or other marine resource utilization, such as tourist destinations, home-based industries and coastal marine and many more containing economic potential that can be utilized. This utilization is juridically possible under Article 14 of Law Number 32 Year 2014 on Marine, namely:

(1) The Government and the Regional Government in accordance with their authority to carry out Marine Management for the greatest prosperity of the people through the utilization and exploitation of Marine Resources using the blue economic principles.
(2) Utilization of Marine Resources as referred to in paragraph (1) may include:
    a. fishery;
    b. energy and Mineral Resources;
    c. coastal resources and small islands; and
    d. nonconventional resources.

The result of marine sand management by private parties with local government is not only related to the financing of mitigation but also for the improvement of education and welfare of the community around the mitigation site which of course to be able to run safely, orderly and still sustainable, it is necessary to use technology and research integrated from universities. In

[5] Kusumasari, *Manajemen Bencana dan Kapabilitas Pemerintah Lokal*. Gava Media Yogyakarta, 2014, page. 22.

addition, community involvement to monitor mitigation cooperation activities and a strict legal framework needs to be established with the local government as a ledding sector.

Such mitigation cooperation efforts have been done by the local government of South Lampung in 2009 and 2013. But it has been stopped because of many people who do not agree with the reasons; first, mitigation cooperation activities involving universities and private parties is only a cover to mine sand and will benefit the private sector and local government only. Second, this activity is either mitigation or mining. Third, mitigation activities like this will damage the environment around the mitigation site. Fourth, the mitigation site is a sanctuary of Krakatau that needs to be protected due to research place for the community (national and international).

In addition to mineral resources, many other economic resources can be utilized by involving the private sector to finance mitigation, but this has not yet been developed. Through universities, with science and technology, mitigation efforts and improving the welfare of coastal communities can be done.

Regardless of the pros and cons of the GAK mitigation cooperation activities mentioned above, it is necessary to examine whether the model of cooperation in mitigation can be done and whether mitigation efforts in the form of involving private parties and universities can cause negative impacts both to the environment and the interests of society, and whether it is not necessary to mitigate the GAK will provide assurance that the disaster will not happen and will not cause greater casualties. All these questions need comprehensive assessment and analysis. In this context, it will focus on the legal and policy aspects of mitigation cooperation involving the three main parties in the process of activities.

1.2 Problems

Based on the background, it can be formulated as follows:

a. What is the urgency of GAK disaster mitigation?
b. How are the basic principles of cooperation and law governing GAK disaster mitigation ?.
c. Whether through the implementation of Triple Helix model in GAK disaster mitigation cooperation is the right model?

1.3 Research Methods

The problem approach used in this paper is the doctrinal approach. This approach is carried out by examining the structure and content of documents related to GAK mitigation, starting from material collection, problem-specific classification and sorting of relevant issues and findings.

The data is used secondary data, ie data obtained not directly from human activities, but data obtained from literature materials.[6] The data in this paper, comprised of primary legal material in the form of international provisions, secondary legal materials in the form of doctrine or expert opinion in the literature. Preparation is done by arranging and placing the material systematically on each subject in order to facilitate the analysis.

The analysis method is used content analysis and qualitative analysis. Content analysis, which examines the contents of existing documents, through the interpretation of constructions, reasoning and rational argumentation. The qualitative analysis, which describes the document in the form of sentences are arranged in detail and systematic.

2. RESEARCH RESULT AND DISCUSSION

2.1 Urgency of GAK Disaster Mitigation

South Lampung is one of the districts in Lampung Province, located at the tip of Sumatra directly opposite the island of Java which is connected with the Sunda Strait. In the middle of the Sunda Strait there is a volcano that legendary, namely Mount Krakatau which until now still active even has appeared to GAK that at any time can cause geological disasters. In addition, among the small islands in the vicinity of Mount Krakatau also entered the fault region which at one time can cause disaster that threatens human life.

Based on the research results, geographically South Lampung Regency is located at 5o15 'LS - 6o LS and 105o00' BT - 105o45'BT covering a total area of 3,406 km3, with 52 (fifty two) small islands, 237 km. South Lampung Regency administratively consists of 20 (twenty) sub-

[6] Helmi Kasim, Syukri Asy'ari, Meyrinda R. Hilipito, Rio Tri Juli Putranto, *Kompitabilitas Metode pembuktian Penafsiran Hakim Konstitusi dalam Putusan Pemilukada*, Jurnal Konstitusi, Volume 9 Nomor 4 December 2012, Jakarta, Kepaniteraan dan Sekretariat Jenderal Mahkamah Konstitusi Republik Indonesia, page. 715.

districts, covering 337 villages and 5 urban villages, with a population of 1,272,129 people, and a density of 315 people / km2. The total population living in coastal areas is more than 80%.[7]

Considering that most of South Lampung Regency is coastal area, Regional Spatial Plan (RTRW) of this regency is based on coastal area development, so every development planning of area is always adjusted with characteristic attached to coastal resources. Such planning is planning the development of growth centers and development centers.

A series of studies is known that South Lampung Regency is one of the most vulnerable areas of natural disasters, both due to tectonic earthquakes (due to faults in Sumatra) and eruption / volcanic eruption of GAK. The existence of this potential threat, then in 2005 the Government of South Lampung District set Environmental Hazard Areas of South Lampung District, which includes the Marine Reserve Area Krakatau Islands, and do Tsunami Hazard Mapping.[8]

The significance of mitigation from GAK disaster threats, because it is very meaningful not only for the life of the people of South Lampung in particular, but also for the people of Lampung and Banten in general. It can even be said that GAK disaster mitigation is a condition of sine quanon (an absolute condition) for the existence of people living in coastal areas of Lampung and Banten. In addition, based on the results of volcanic geological studies in the area Kalianda and surrounding areas, South Lampung regency there are four groups of volcanoes, both active volcanoes, old volcanoes and ancient volcanoes are:[9]

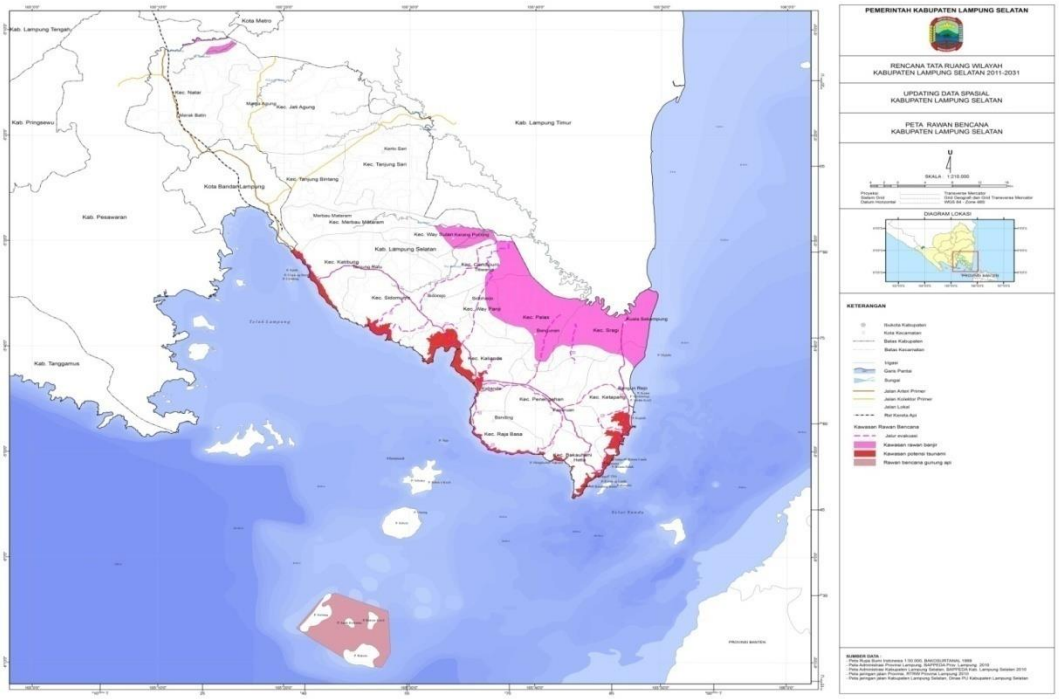
a. Groups of volcanoes Sebesi, Sebuku, and Tiga
b. Groups of volcanoes Sangiang, Kandangbalak and Harimaubalak
c. Groups of ancient volcanoes in the mainland of South Lampung, and
d. The Rajabasa volcano group

The first group forms a straight line north-south-east direction. It stands southwest in line with G. Krakatau and P. Panaitan in Ujung Kulon, West Java. While to the northeast of the series of volcanoes that continue to G. Rajabasa near the capital of South Lampung regency, Kalianda. The continuation of the second group of volcanoes to the southeast toward the Dano volcano complex in Banten province, while to the northwest continuously to G. Rajabasa, and even to the

[7]Drafting team, *Kajian Ilmiah Mitigasi Bencana Erupsi G. Anak Krakatau,*South Lampung Regency, 2013
[8]Bronto, S., 2013. *Kajian Ilmiah Mitigasi Bencana Gunung Api Anak Krakatau Lampung South (Model Pengelolaan Cagar Alam Secara Kalaboratif), South Lampung Regency, page. ,12.*
[9]*Ibid*

Tanjungbasurung Purba volcano on the coast of Marina. The third group of volcanoes, in the eastern part there are ancient volcanoes Taman and Ruguk, and in the middle of G. Kepayang. On the west coast there is a series of ancient volcanoes ranging from G. Tanjung Tua-Malang on the southern to North end of G. Lumbung and G. Mangkudu. The emergence of volcanoes is very closely related to tectonic activity that is still ongoing until today.[10]

Figure 1. Map of Disaster Prone South Lampung District



Source: Bappeda South Lampung, 2012

Various forms of hazard threat from tectonic activities in the Sunda Strait, mitigation efforts that can be done is outside of the GAK reserve area, because the reserve area is the authority of the central government, the Ministry of Forestry. The location of the mitigation activity is carried out between the three islands which is the fault line, that is. Sebuku Island, Sebesi Island and Pulau Tiga.

Quantitatively, the strategic value of GAK mitigation for South Lampung Regency is:[11]

(1) Soul salvation for 920,000 inhabitants who inhabit the coast of South Lampung.

[10] *Ibid*

[11] Academic Paper, *Rancangan Peraturan Daerah Kabupaten Lampung South Tentang Pelaksanaan Mitigasi Regional Bencana Gelogi Di Wilayah Kabupaten Lampung South*, South Lampung, 2014. hlm.

(2) The rescue of other public utilities, facilities and utilities as well as the houses inhabited by coastal areas.

(3) Rescue coastal resource resources, such as community ponds, intensive ponds, coral reefs, floating charts, seaweed cultivation and other resources.

Other activities that are also important are the creation of evacuation routes with completeness, construction of evacuation sites, planting of beach plants, including other activities, such as economic empowerment of coastal communities (fishermen, farmers, farmers), research, training and extension. Many activities that need to be done require cooperation, especially cooperation of sector or region, like area of Banten and Lampung. Therefore, the urgency of GAK mitigation in the form of cooperation through the triple helix model, make a real contribution for the community in improving their welfare. The existence of the three parties in synergy and mutual benefit results, in addition to improving local revenue in the form of revenue sharing and taxes, also can to grow the incomes of coastal communities trying in the form of home-based industries of coastal resources.

2.2 Basic Principles and Legal Arrangements of Mutigation and Mineral Utilization Cooperation of GAK

Mitigation of geological disasters on Sebesi Island, Sebuku and Tiga Island includes the installation activities of the tool is selected along the break line of Krakatau Mountain which aims to monitor the geological condition that can cause the Tsunami and the dredging of the lava slope that threatens the coastal area of South Lampung Regency. Based on the discussion with geologists that the installation of the instrument should be placed on the seabed and can not be buried in sand. Therefore, as long as the mounting area of the instrument is in safe state and the sand of the sea covering the surface of the instrument is removed.[12]

Besides the installation of detection equipment, based on the recommendation from the study, the reduction of Mount Anak Krakatau growth rate is done through solid particle taking, within safe limits, while maintaining the sustainability of the Krakatau Islands and Marine Reserve around it, and beneficial to improve the welfare of the community, especially in Regency of South Lampung. The solid particle taking activity that is making the lava melt

[12]Discussion on Regional Disaster Mitigation, 23 September 2015.

channel to be in line with the conservation activities, it should be mentioned in the Five Year Work Plan and Annual Work Plan as the follow up of the Plan of Management of the Krakatau Islands Nature Reserve.[13]

In general, mitigation programs can be divided into sections, based on various things. (1) based on the time of achievement, mitigation can be divided into short-term programs and long-term programs. (2) the extent of the area of achievement, mitigation can be divided into local mitigation and regional mitigation programs.

Based on the method of mitigation approach can be done scientifically-physical and non-physical mitigation related to social-society aspect. Regional and long-term mitigation programs (10 years or more) are translated into local and short-term (annual) mitigation action plans.

In scientific-physical mitigation, physical mitigation activities must align and sustain scientific mitigation activities. Both should be based on the results of scientific research and development of monitoring technology for various types of disasters. Broadly speaking, scientifically mitigation, among others, through approaches in geology, geophysics, geochemistry, geospasial, and biology. In addition, these activities should all be based on a clear legal umbrella, since the law in principle aims to create certainty, benefit and justice.

2.2.1 Basic Principles and Arrangement of Mitigation Cooperation

Based on the results of the review of laws and regulations, there are basic principles and legal arrangements for mitigation, such as mitigation activities conducted on the basis of three principles, namely safe, useful and sustainable. Safe means to avoid the catastrophic disaster. Useful is intended morally and materially beneficial or beneficial to the general public and local government, while sustainable means that mitigation activities do not damage the environment or keep the balance of nature on an ongoing basis.

Cooperation in maritime territories, including mitigation under international law, particularly in the *United Nations Convention on the Law of the Sea 1982* (UNCLOS 1982), whether related to marine scientific research, the transfer of technology, the use and protection of decisive marine resources can be undertaken with foreign parties (other countries and international organizations).

[13] *ibid*

The basis of cooperation between these countries shall not be contrary to the meaning of Article 242 of UNCLOS 1982 establish that: cooperation shall respect sovereignty and jurisdiction and mutual benefit, scientific research cooperation for peaceful purposes. In addition, it is necessary to prevent and control damage to the health and safety of people to the marine environment.

Based on the results of the study of mitigation legislation, there is arrangement of cooperation. Article 30 of Law Number 24 Year 2007 Disaster Relief, cooperation with Foreign parties is also regulated. International agencies and non-governmental foreign agencies may participate in disaster management activities and be guaranteed protection from the Government against their workers. International agencies and non-governmental foreign agencies in conducting disaster management activities may engage independently, jointly, and / or with Indonesian counterparts with due regard for local social, cultural and religious backgrounds.

Activities in the region shall be done in accordance with a formal written work plan, through licensing mechanisms by the authorities and carried out by work units in accordance with their respective areas of authority and realized in the form of joint contracts, both in the form of Memorandums of Understanding (MoU) financing agreement. Such contracts may establish joint arrangements and local governments shall oversee activities in the Area in accordance with agreed contracts and work plans. The contract must provide certainty of work. The contract should not be reviewed, suspended or terminated except under mutual agreement. Implementation of international cooperation agreements in the management of international seabed areas must be synergized between the interests of coastal countries and international interests.[14]

Cooperation undertaken, regionally or globally shall be subject to the general principles of marine natural resource management, as provided in Article 197 of UNCLOS 1982, to formulate and explain internationally recommended provisions, standards and practices and procedures consistent for the purpose of protecting and preserving the marine environment, taking into account the distinctive regional features.

Technically the arrangement of cooperation in the form of an agreed contract should be carried out with the principle of *Pacta sun servanda*, the binding promise as the law for which it

[14]In American Dictionary *Websters Dictionary*, the meaning of Synergy is *"cooperative interaction among group especially among the acquired subsidiary or merged parts of a corporation that creates an enhanced combined effect"* "which implies only with cooperative interaction that maximum results can be achieved.

is made and should be carried out in good faith.[15] Other principles of agreement that also need to be considered, such as the *Courtecy Principle*, are mutual respect and respect for the sovereignty of other countries and the principle of *Egality rights*, ie each country has the same position. Another principle that is not less important is the principle of *pacta tertiis nec nocent nec prosunt*, non retroactive principle, and the principle of *ius cogens*.[16]

The basis of mitigation cooperation in marine territory shall not be contrary to the meaning of Article 242 paragraph (1) of UNCLOS 1982 establish that: States and competent international organizations, in accordance with respect for sovereignty and jurisdiction and on the basis of mutual benefit, shall promote international co- marine scientific research for peaceful purposes.

Particularly for cooperation between countries with or fellow international organizations, it shall be based on Article 273 of UNCLOS 1982 which provides that states should cooperate actively with competent international organizations and the Authority, to encourage and facilitate the transfer of related marine skills and technologies with activities in the region, to developing countries of their nationals and companies.

The form of cooperation shall be based on the principle of cooperation as set forth in Article 278 UNCLOS 1982, namely the competent international organizations referred to in this Chapter and in Chapter XIII UNCLOS 1982 shall take all necessary measures to ensure, either directly or in close cooperation between them, effective implementation, functions and responsibilities.

Implementation of international cooperation agreements in the management of international seabed areas must be synergized between the interests of coastal countries and international interests.[17] According to Doctoroff (1977) states, the main requirements for an ideal synergy system are trust, effective communication, fast feedback, and creativity. In other words, synergy is a powerful source of organizational power, often used to show the difference between

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[15]Harry Purwanto, 2009, *Keberadaan Asas Hukum Pacta Sunt Servanda Dalam Perjanjian Internasional*, Jurnal Mimbar Hukum Volume 12 No. 1 February 2009, Law Faculty Yogyakarta, *www.mimbar.hukum.ugm.ac.id/index.php/.../201* , page. 157, downloaded 6 March 2013

[16]Heryandi, *Kerjasama Internasional Pengelolaan Sea Bed Area dan Implikasinya Bagi Negara Pantai*, Jurnal Dinamika Hukum, Law Faculty Universitas Jenderal Soedirman Purwokerto Centra Java, ISSN 1410-0797, Volume 13 No. 3 accredited Dikti Number 58/DIKTI/Kep/2013. 2015, page 14.

[17]In American Dictionary *Websters Dictionary*, the meaning of Synergy is*"cooperative interaction among group especially among the acquired subsidiary or merged parts of a corporation that creates an enhanced combined effect"* "which implies only with cooperative interaction that maximum results can be achieved.

success and failure.[18] In terms of management, synergy means competing better than expected to achieve a standard competitive advantage. [19]

Cooperation stipulated in international law can be handed down to cooperation conducted in Lampung area. Business entities that will distribute financing and financing are not sufficient to be limited only to alleviate the suffering of disaster victims or displaced persons, but also to be expanded, including for mitigation activities, since the principles of disaster management include: (1) humanitarian; (2) justice; (3) equal status in law and government; (4) balance, harmony, and harmony; (5) law and order of law; (6) togetherness; (7) environmental sustainability; and (8) science and technology.

The principles mentioned above, became the foothold of all activities including the principles in disaster management, namely: (1) fast and precise; (2) priority; (3) coordination of coordination and integration; (4) efficient and effective; (5) transparency and accountability; (6) partnership; (7) empowerment; (8) non-discriminatory; and (9) nonprofits.

Principles and principles in disaster management should be a foundation for cooperating between local governments and business entities. Therefore, if a business entity engages in a large mitigation mitigation activity, if such mitigation activities based on science and technology can be utilized, the provision of utilization opportunities by business entities should also be provided on the basis of partnership principles, efficient and effective.

This provision can mean that the utilization of natural resources and other resources by local governments should still refer to the applicable sectoral laws on natural resources. Law Number 32 Year 2004 regarding Regional Government as umbrella rules in the implementation of regional government that is generalist regulate only the outline of local government authority in terms of natural resource management and quite anticipatory avoidance of conflict with the law other in the field of natural resources.

The State shall ensure the right of the environment, which implies that the state is also obliged to manage resources in the form of energy and mineral resources in a planned manner. All of this needs to be followed up with a Regional Regulation that aims to:

a. estimating and anticipating the threat of geological disasters;

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[18]Subaktian Lubis, *Sinergi Pengelolaan Sumber Kekayaan Alam Di Laut Yang Diharapkan,* Pusat Penelitian dan Pengembangan Geologi Kelautan, http://www. mgi.esdm.go.id.

[19]*Ibid*

b. ensure the implementation of regional geological disaster mitigation in a planned, integrated, coordinated, comprehensive and sustainable manner;
c. building public and private participation and partnerships;
d. minimize the impact of disasters;
e. reducing vulnerability and improving the community's ability to cope with disasters.
f. Optimizing the utilization of geological science and technology and the utilization of capacities and resources owned by the region.

A mitigation cooperation involving a business entity, in the laws and regulations stipulated in Article 28, stipulates that the Business Entity shall have the opportunity to administer disaster management, either individually or collectively with other parties. Furthermore, in Article 29 is regulated:

(1) The business entity shall adjust its activities with the policy of disaster management.
(2) Business entities are obliged to submit reports to the government and / or agencies assigned to undertake disaster management and to inform the public transparently.
(3) Business entities are obliged to heed the principle of humanity in carrying out its economic functions in disaster management.

The involvement of business entities, in Disaster Management Law, is followed up by Government Regulation Number 21 of 2008 on Disaster Management Implementation, Article 8 paragraph (5) stipulates that the regional disaster risk reduction action plan is prepared thoroughly and integrated in a forum covering elements of local government, non-governmental organizations, communities, and businesses in the respective regions coordinated by BPBD.

Particularly related to the repatriation in the coastal and marine areas, cooperation with involving the business sector is set in Article 87 paragraph (2) of Government Regulation of the Republic of Indonesia Number 21 Year 2008 on Disaster Management Implementation. The structuring of disaster prone areas is done through the efforts of:

a. conduct disaster-caring campaigns;
b. encouraging the growth of caring and loyal
c. comrades to institutions, civic organizations,
d. and business world; and
e. encourage participation in financing

f. and disaster preparedness activities.

g. Implementation of participation and participation of institutions and community organizations, business and community is carried out by related institutions / institutions in coordination with BNPB.

2.2.2 Basic Principles and Regulations on the Cooperation of Resource Use

Mitigation activities often lead to follow-up, such as river dredging due to silting that causes floods, the follow-up material needs to be removed and used for hoarding in the lowlands. Similarly with the installation of early detection tools and dredging lava ducts, need to be removed so as not to become a material buildup so it will clog up and will cause negative effects. Minerals that can be utilized in mitigation is quite a lot and can be for financing activities as well as to increase local incomes and community welfare. Sutawidjaja (2006) noted that the amount of sedimentation material of MOUNT Anak Krakatau eruption from 1992 to 2001 (9 years) was 24,871,225 m3 consisting of 15,127,895 m3 of lava and 9.743.330 m3 of loose material; or the average body growth of Mount Anak Krakatau is about 2,763,469 m3 / year. For operational technical reasons for making lava ducts, the material excavated and displaced by 2,763,469 m3 / year is likely to be more realistic.[20]

Utilization of the follow-up material from mitigation, of course, becomes a separate issue, because on the one hand the material can be said to be waste but on the other hand is a mining material, so the arrangements are subject to two regimes, namely the mitigation regime and the mining regime. The fundamental difference between mitigation and mining activities lies in the source of the disaster. Activities undertaken related to the existence of disaster sources can not be subordinated to the mining regime. The follow-up material of mitigation activities remains subject to the regulation of the mitigation regime, unless it is at the place of activity solely the utilization of resources that there is no source of disaster, then subject to mining arrangements. Therefore, the utilization of resources due to mitigation activities needs to be regulated in particular permits related to mitigation.

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[20] Sutawidjaja, I.S, *Proses Terjadinya Gunung Anak Krakatau dan Rencana Mitigasinya*. Seminar Sehari "Mitigasi dan Penataan Kawasan Cagar Alam Kepulauan Krakatau", Jakarta May 29, 2006

Article 31 of the Disaster Management Law stipulates that the implementation of disaster management is carried out based on 4 (four) aspects including: (a) social, economic, and cultural societies; (b) environmental sustainability; (c) expediency and effectiveness; and (d) the scope of the territory.

These four aspects are a unity that must be a reference, but the fourth aspect of which is the basis for the utilization of resources in mitigation activities. If this article is linked to mitigation funding, not only the responsibility of the government and local government, but also sourced from the community as stipulated in Article 60 paragraph (2) stipulating that: The Government and regional governments encourage community participation in the provision of funds sourced from the community. Furthermore, specifically on the aspects of exploitation and effectiveness of disaster mitigation in coastal areas and small islands regulated in Government Regulation No. 64 of 2010 on Disaster Mitigation in Coastal Areas and Small Islands, Article 13 paragraph (4) which is essentially the same. However, specifically referred to as the aspect of usefulness and effectiveness, in the Elucidation of Article 13 Paragraph (4) Letter c is a disaster mitigation activity reducing the risk of human casualties, loss of property, and increasing the productivity of resources and the economy of the people. Under these arrangements, disaster mitigation should also be utilized for community productivity and economic resources. Through what efforts to improve it, of course through the utilization of existing resources.

2.3 Cooperation of GAK Disaster Mitigation Through the Triple Helix Approach

2.3.1 Authority to Establish Regional Regulations and Cooperation Policies

The Triple Helix concept was first introduced by Henry Etzkowitz and leydesdorff (1995) in analyzing the relationship between university, industry and government. This concept adopts the biological concept of the Triple Helix DNA model that centers on the integration and synergy of each element's role to develop knowledge-based products, expansion of industry and services as the foundation of regional and national innovation systems. Further developed by Gibbon, at.al (1995) in The New Product of Knowledge and Nowotny at. Al (2001) in Re-Thingking Science. This concept is in addition used to describe the three elements, this model also provides

an overview of the coordinates of the symbiosis of each element. In Triple helix each element is a stand-alone entity, has its own role, but they synergize and support one another.[21]

In relation to the concept of triple helix, in Mitigation Activities which is a series of efforts to reduce disaster risk, both through physical development and awareness and enhancement of the ability to face disaster threats, it is certainly necessary to model the right approach, one of them through triple helix model. Based on the study area, it is known that the three islands that will be used as a mitigation area are small islands that enter the administrative area of South Lampung regency, but based on the authority of the government in the sea territory, in accordance with the Law of the Regional Government and the Maritime Act, the area of mitigation activity at present the authority is in Lampung Province.

Article 5 of Law Number 24 Year 2007 on Disaster Management, it is stipulated that the Government and regional governments shall be responsible for the implementation of disaster management. The authority of local government is regulated in Article 9 of Law no. 24/2007, covering:

(1) the establishment of disaster management policies in its territory in line with regional development policies;

(2) development planning that incorporates elements of disaster management policy;

(3) implementation of cooperation policy in disaster management with other provinces and / or districts / cities;

(4) regulation of potential use of technology as a source of threat or disaster hazard to its territory;

(5) the formulation of prevention policy of natural resources control and dissipation that exceeds the natural ability of the region; and

(6) control of collection and distribution of money or goods at provincial, district / city scale.

Based on the authority in the above legislation, the implementation of disaster mitigation remains at the jurisdiction of the provincial government. Therefore, in the context of the cooperation undertaken, the main control of the contract is on the government. The principle of authority to

[21] Hasan Sitorus, *Peranan Perguruan Tinggi Dalam Penerapan Triple Helix*, Asia Journal, in https://www.jurnalasia.com/opini/peranan-perguruan-tinggi-dalam-penerapan-triple-helix/, Posted April 13, 2016.

control this activity, of course, must be done in accordance with the principle of good government.

2.3.2 Shape and Responsibility of the Parties

Integration in mitigation efforts at least there are three related parties, namely local government, business entities and universities that became the main party in mitigation efforts. This model of mutually beneficial cooperation between the three parties can be done through the Triple Helix approach, which is the synergy and unification of three groups consisting of academics, business or employers and government. These three circles have the motivation to improve the dynamics and power of economic sustainability. According to Wishnu (in APEC CEO Summit 2013 Indonesia), Academician, business and government serve as a production house while government sources of contractual relationships ensure stable interaction and exchange and college as a source of new knowledge and technology. The synergy of these three sectors is a generative principle in build the economy based on knowledge that enable the achievement of closer economic integration in the region.[22]

A mutually beneficial cooperation between the three parties above, should be based on a clear legal umbrella of cooperation and provide certainty, benefit and justice for the parties in contractual relations, as well as for the community. Build the umbrella of contractual law is defined in the local regulations. Each side will cooperate and monitor each other, so that things that will hamper can be overcome to run the principles of cooperation.

Based on the results of the report from the executor of the geological mitigation of Sebesi Island, Sebuku, and Pulau Tiga, it can be seen that the activity, not only consists of physical but non-physical in a form of GAK mitigation cooperation contract. Participating parties, that are Lampung local government, private and university signatories of Memorandum of Understanding (MOU) are conducted by authorized officers at the organizational leadership level (Governor, Rector and Director). Subsequently each party establishes a technical agreement on the implementation and cooperation program, carried out at the implementing level:

1. Government elements, consisting of: BPBD, Mining Agency, Bappeda, Department of Marine and Fisheries, Environment

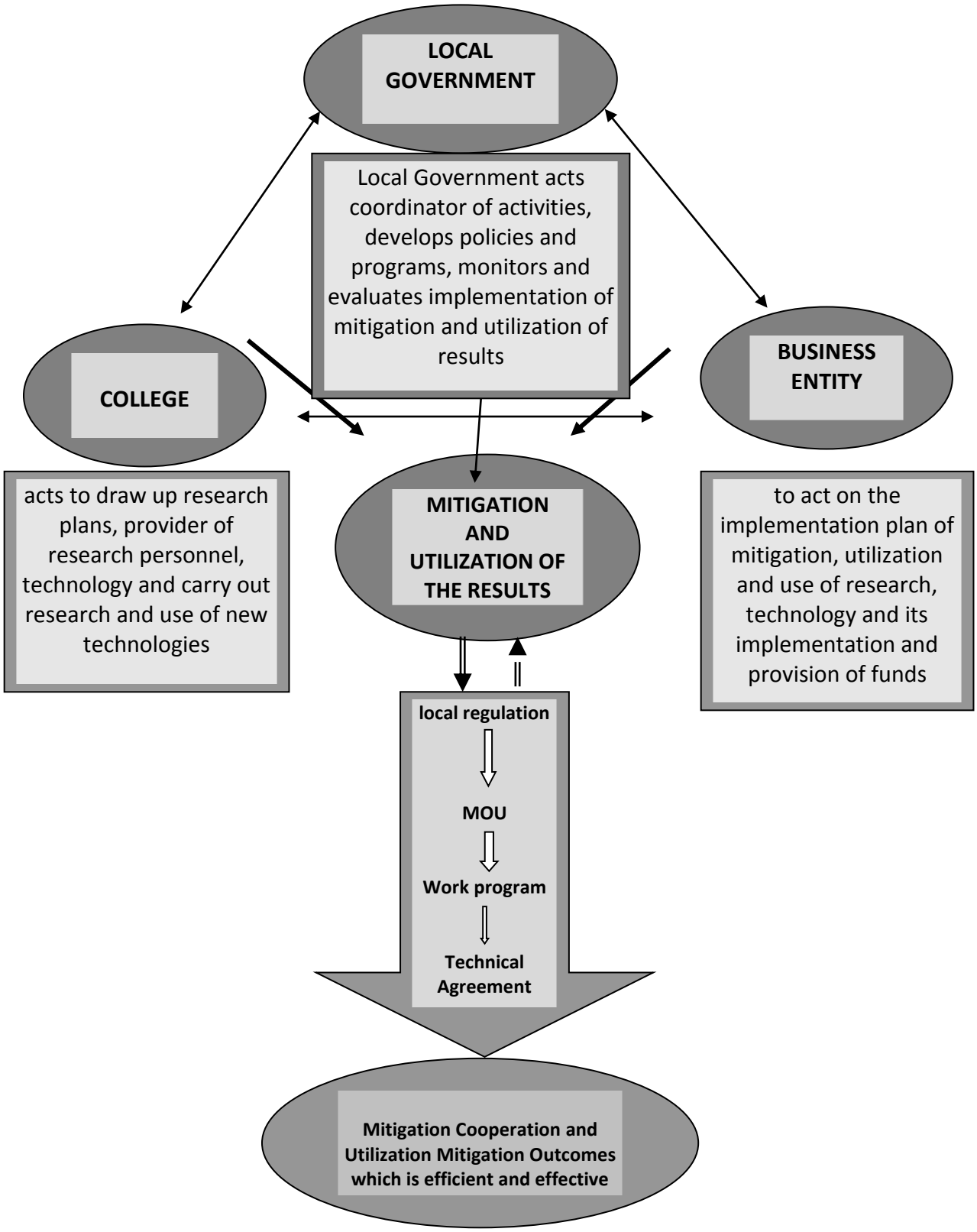
[22] Apec CEO Summit 2013, Indonesia 2013, *Konsep ABG (Akademic, Business, Government*, http//www. apec2013ceosummit.com/pres/Kuliah-umum-abac-di-unair-konsep abg-academic-business-government prinsip-generatif-untuk-pembangunan-ekonomi-yang berbasis-pengetahuan.html, Agustus 2014, (20:35)

2. Higher Education: Institute of Research and Service, Geologist of Disaster, Marine Biologist, Environmentalist, Marine Law Expert, Sociologist, Economist

3. Business Entity / Company: Managers and technicians related field required

Connectivity and individual responsibilities in the triple helix model are illustrated in the following scenes.

Figure 2. Model of Mitigation Cooperation (Triple Helix Approach)



Local government, as coordinator of activities, and responsible duty to carry out mitigas activities and utilization of its follow-up resources. Plan activities together and conduct monitoring and evaluation of activities undertaken. The most appropriate legal basis prior to the signing of a memorandum of understanding, the Provincial Government needs to establish regional regulations on mitigation, so it has a clear and strong policy base. The regulation should also regulate the involvement of private parties in the implementation of mitigation and utilization of minerals that must be eliminated for the manufacture of lava lanes, transport and manage into useful materials.

Sharing of the utilization of this material must consider the environmental carrying capacity, including living creatures and underwater life. Through the concept of blue economy and formulated in a clear policy mitigation efforts and resource utilization can be synergized by not damaging the marine environment.

The material utilization as a result of mitigation activity is aimed solely for the financing of mitigation and the improvement of the welfare of the surrounding community in the form of financing of home industry economy based on coastal and marine resources. The calculation of the amount of material that can be utilized and the financing of mitigation must be balanced through the planning mechanisms undertaken by the team.

In the Decree of the Minister of Home Affairs Number 131 of 2003 on Guidelines for Disaster Management and Refugee Management in the Region, it is mentioned that: Costs incurred in the implementation of National Disaster Prevention and / or Handling are charged to APBN, Provincial Budgets and Regency / City Budgets and depend on the territorial authority of the disaster. In addition, governments, provincial and district governments may receive assistance from non-governmental organizations, foreign aid, as well as other legal and non-binding sources of funds.

In addition to the above regulations, in relation to the source of disasters in the marine areas regulated in special regulations, namely Government Regulation Number 64 of 2010 on Disaster Mitigation in Coastal Areas and Small Islands, Article 18 paragraph (3) stipulated that the Government district / city conducting disaster mitigation in coastal areas and small islands within the district / city authorities. Article 19 PP. 64/2010 also establishes the responsibility of the community, including:

(1) preserving the environment, maintaining balance, harmony, conformity, and sustainability of environmental functions;

(2) conduct disaster mitigation activities for its activities and other uses; and

(3) provide information on hazards and / or environmental damage in coastal areas and small islands.

Based on the legislation that has been studied, it can be concluded that the form of geological mitigation activities GAK located in the Sunda Strait conducted in Sebesi Island, Sebuku and Pulau Tiga. In its implementation it is the responsibility of the provincial government Article 10 paragraph (3 and 4) stipulated that : paragraph (3) The disaster mitigation plan as referred to in paragraph (2) shall be part of the Regional Disaster Management Plan established by the regional government, and paragraph (4) stipulates that the disaster mitigation plan as referred to in paragraph (2) shall at least include the choice of structural / physical and / or non-structural / non-physical disaster management actions and disaster management actors. In the event that the Regional Disaster Management Plan as referred to in Article 10 paragraph (3) has not been determined, in accordance with the provisions of Article 12 paragraph (1) the regional apparatus unit in charge of marine and fisheries shall prepare disaster mitigation plans for inclusion in RPWP-3-K and in the case of the Regional Action Plan for Disaster Risk Reduction as referred to in Article 11 paragraph (4) has not been established, the regional apparatus unit in charge of marine and fisheries shall prepare disaster mitigation activities to be incorporated into the RAPWP-3-K.

Table 1. Duties and Responsibilities of the Parties in Mitigation

No.	Parties	Duties	Responsible
1	Government	- Formulate plans and evaluation of policies and programs on: mitigation, cooperation, technology use, funding, engagement, business entities and communities. - Coordinate the preparation of cooperation agreements and their	- Making Plan, implementation, monitoring and evaluation activities. - Formulate and Execute agreements. - Do supervision of the implementation of mitigation and utilization of resources.

		implementation	
2	Academia	- Develop research plans, research mapping, research personnel, and technology preparation in research. - Conducting research, use of technology and research results for mitigation. -Mail monitoring of application of mitigation technology.	- Arrange and prepare a research plan and use of the technology to be applied. -Making a survey, research and consequently mapping survey -Provision of research personnel and technological innovation. - Implement the agreement. -Reported results of the use of research funds and purchases of technology.
3	Entrepreneur	- Making a business plan in the use of technology. - Calculate mitigation financing and utilization of mitigation follow-up results. - Do fund sharing and preparation of mitigation funds. - Implementing funding activities. - Monitoring the use of funds. - Provide reports on the use of funds and utilization proceeds.	- Provision of research and technology funding. - Implement agreement - Reporting results from beneficiaries of mitigation activities. -Fill legal obligations in mitigation implementation.

Based on the model and division of tasks of each of the above parties, there are two interpretations of the triple helix model in the implementation that are neo-corporation interpretation and triple helix evolutionary interpretation. The neo corporation's interpretation focuses on achieving a consensus of activities between academia, industry and government representatives with the involvement of innovation coordinators. This coordinator then plays an important role in the innovation process and becomes the main pillar in planning the integration process of the three elements of triple helix. Nevertheless, the experience of several European

countries shows that the neo-corporate model is not satisfactory in terms of integration between the three elements of the university, the business world and the government. The second interpretation of the triple helix model is an evolutionary model in which the role of government is limited but more crucial. In reality, the government is instrumental in formulating an appropriate normative framework for encouraging university and business orientation in achieving a high degree of integration. The evolutionary approach of the triple helix model assumes that in a specific local context; universities, governments and businesses seek to stimulate economic growth through a development called mutually beneficial relationships.[23]

From the two interpretations models above, the evolution model is suitable for mitigation cooperation, because as local governments should play a role while others support the role, in accordance with the National Disaster Management and Regional Disaster Management program.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

Based on the results of research and discussion, it can be summarized as follows:

(1) GAK mitigation is an important effort to protect people from disasters that can happen anytime, so early anticipation can be done, because the potential of GAK as a source of disaster is increasing.

(2) The basic principle of cooperation on geological disaster mitigation of GAK, has been regulated in national and international provisions stipulating that the principle of disaster management is safe, beneficial and sustainable under the principle of cooperation, such as: Principle of Courtecy, Egality rights, pacta tertiis nec nocent nec prosunt principle, non retroactive principle, and ius cogens principle.

(3) The application of Triple Helix model in cooperation of geological disaster mitigation GAK is the right approach, mitigation requires an integrated and systematic policy framework conducted by the government (central / regional) in accordance with its authority, require large financing so it is necessary to involve the business entity, and requires technology that can be sourced from universities.

[23] Heryandi, dkk, 2018, *Kajian Pengembangan Pengaturan Untuk Peningkatan Kapasitas Lembaga Penelitian dan Pengembangan Daerah (Pendekatan Triple Helix),* Office of the Ministry of Research and Technology, Jakarta, page. 43.

3.2 Recommendations

Based on the results of the conclusions can be recommended as follows:

(1) The Provincial Government of Lampung needs to formulate a Regional \ Regulation on Mitigation, to serve as a triple helix legal umbrella for mitigation efforts.

(2) Formulate the GAK mitigation program, formulate the steps of cooperation between the local government, business budgets and universities.

(3) Conduct mitigation efforts through triple helix model, consistently and consequently to avoid misunderstanding of resource use as an economic potential that can be used as one of mitigation financing solution.

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