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Active Faults in the Volcanic Environment of Pasirwangi Region, Garut Regency

Sesar Aktif di Lingkungan Gunung Api di Wilayah Pasirwangi, Kabupaten Garut

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Abstract-. Garut Regency is surrounded by many volcanoes, both active and inactive. This area has also several active faults, which historically have been the source of earthquakes, including the Rakutak Fault Segment as part of Garsela Fault and several local faults. Some of earthquakes has magnitude less than M5.0 but causing damages, such as lately occured on September 18 and December 7, 2024.

This study aims to identify the root causes of the major earthquakes that frequently occur in the Garut area, particularly those felt locally in Pasirwangi Sub-District and its surroundings, which causing infrastructure damages. The results are expected to contribute to disaster risk reduction and geological hazard-based spatial planning in Garut Regency, particularly in the study area.

Active faults mapping was carried out using remote sensing, and field verification using drone and visual observations to obtain data that characterizes the presence of faults, joints measurements, rock offsets, river diversion and morphology lineaments. Site class identification was carried out by microtremor measurement using seismograph.

Indications of active faults are found in the form of morphological and river lineaments, rock offsets, river diversion and the emergence of springs as indications of fractures along the fault line. Several sagponds were found including in Cihurang which is connected to Lake Ciharus which forms the Rakutak fault segment lineament which is relatively southwest-northeast (SW - NE) oriented. Others were found at Lake Cipondok which is connected to the river lineament in the Cibongkor area which has a west southwest-east northeast (WSW-ENE) direction. The down-dip faults were observed at Padaawas and has trend

Abstrak-. *Wilayah Kabupaten Garut dikelilingi oleh banyak gunung api, baik yang masih aktif maupun yang sudah tidak aktif. Wilayah ini juga memiliki beberapa sesar aktif, yang secara historis telah menjadi sumber gempa bumi, termasuk Segmen Sesar Rakutak sebagai bagian dari Sesar Garsela dan beberapa sesar lokal lainnya. Beberapa gempa bumi memiliki magnitudo kurang dari M5.0 tetapi menyebabkan kerusakan, seperti yang baru-baru ini terjadi pada tanggal 18 September dan 7 Desember 2024.*

Penelitian ini bertujuan untuk mendapatkan sumber penyebab utama gempa bumi utama yang sering terjadi di daerah garut, khususnya yang secara lokal dirasakan di wilayah Kecamatan Pasirwangi dan sekitarnya dan menyebabkan kerusakan pada infrastruktur. Hasil penelitian ini diharapkan dapat memberikan kontribusi pada pengurangan risiko bencana dan perencanaan tata ruang berbasis bencana geologi di wilayah Kabupaten Garut, khususnya di daerah penelitian.

Pemetaan sesar aktif dilakukan dengan menggunakan metode penginderaan jauh, dan verifikasi lapangan menggunakan pengamatan visual dan drone untuk memperoleh data karakteristik keberadaan sesar, pengukuran kekar, pergeseran batuan, pengalihan sungai dan kelurusan morfologi. Identifikasi kelas tapak dilakukan dengan pengukuran mikrotremor menggunakan seismograf.

Indikasi sesar aktif ditemukan dalam bentuk morfologi dan kelurusan sungai, pergeseran batuan, pembelokan sungai dan munculnya sumber-sumber air sebagai indikasi adanya rekahan di sepanjang garis sesar. Beberapa sagpond ditemukan antara lain di Cihurang yang terhubung dengan Danau Ciharus dan membentuk kelurusan yang relatively south southwest - north northeast (SSW - NNE). Microtremor measurements obtain the dominant frequency values of the research area is in the range of 1 - 4 Hz, Periods of 0,25 – 1 second, the earthquake amplification factors of 3 – 7 times of earthquake shaking, Vs30 of 233 - 545 m/sec. The sediment thickness ranges from 25 - 64 m, and the land type is Class C (Hard Soil) and Class D (Moderate Soil).

The Pasirwangi Sub-District and its surroundings, is located in a volcanic environment and is traversed by active faults, which are relatively southwest – northeast (SW-NE), west southwest - east northeast (WSW-ENE), and south southwest – north northeast (SSW-NNE). The Rakutak Segment of Garsela Fault, Padaawas and Cibongkor Faults are active faults that cross the research area, which is in the future could become the source of earthquakes, so that the community needs to be aware, especially those located close to fault lines. The potential for geological disasters in the Pasirwangi Sub-District and its surroundings, needs special attention from various parties, related to disaster mitigation efforts, both structural and non-structural.

Keywords: Active Faults, Sagponds, Morphological Lineaments, Rocks Offset, Site Class

diduga sebagai segmen sesar Rakutak yang berarah relatif baratdaya-timurlaut (BD-TL). Sagpond lainnya ditemukan di Danau Cipondok yang terhubung dengan kelurusan sungai di daerah Cibongkor yang berarah barat baratdaya- timur timurlaut (BBD-TTL). Sesar turun teramati di Padaawas dan berarah relatif selatan baratdaya- utara timurlaut (SBD-UTL). Hasil pengukuran mikrotremor diperoleh nilai frekuensi dominan daerah penelitian berada pada kisaran 1 - 4 Hz, perioda dominan 0,25 – 1 detik, faktor amplifikasi gempa bumi 3 - 7 kali penguatan guncangan, Vs30 sebesar 233 - 545 m/detik. Ketebalan sedimen berkisar antara 25 - 64 m, dan jenis tanah termasuk Kelas C (Tanah Keras) dan Kelas D (Tanah Sedang).

Wilayah Kecamatan Pasirwangi dan sekitarnya, terletak pada lingkungan vulkanik dan dilalui oleh sesar-sesar aktif yang berarah relatif baratdaya-timurlaut (BD-TL), barat baratdaya – timur timurlaut (BBD-TTL) dan selatan baratdaya – utara timurlaut (SBD-UTL). Segmen Rakutak Sesar Garsela, Sesar Padaawas dan Sesar Cibongkor merupakan sesar aktif yang melintasi daerah penelitian, yang di kemudian hari dapat menjadi sumber gempa bumi, sehingga masyarakat perlu waspada, terutama yang berada dekat dengan garis sesar. Potensi bencana geologi di wilayah Kecamatan Pasirwangi dan sekitarnya, perlu mendapat perhatian khusus dari berbagai pihak, terkait dengan upaya mitigasi bencana, baik yang bersifat struktural maupun non-struktural.

Kata Kunci: *Sesar Aktif, Sagpond, Kelurusan Morfologi, Offset Batuan, Kelas tanah*

INTRODUCTION

The area of Garut Regency is surrounded by many volcanoes, both active and inactive. In addition to volcanoes, this area has several active faults, which historically have been the source of earthquakes, including the Rakutak Fault Segment as part of Garsela Fault. The study conducted in this area was to investigate in more detail the existence of active faults in the volcanic environment, such as in the area of Pasirwangi District (Figure 1).

In this region, there are some earthquakes with magnitude less than M5.0 but causing damages, such as lately occured on 18 September and 7 December 2024. The results of this study is expected to contribute in reducing the risk of geological hazards and become a reference material in disaster reduction and spatial planning. The research area is the Pasirwangi District and the adjacent areas including the Samarang, Tarogong Kidul, and Sukaresmi Districts which are geographically located at coordinates of 7°09’36”S - 7°15’00”S and 107°44’00” – 107°54’00”E (Figure 1).

This study aims to identify the root causes of the major earthquakes that frequently occur in the Garut area, particularly those felt locally in Pasirwangi Sub-District and its surroundings, which causing infrastructure damages. The results are expected to contribute to disaster risk reduction and geological hazard-based spatial planning in Garut Regency, particularly in the study area.

General Reviews

Physiographically, Garut Regency is included in the South Mountain Zone of West Java and the Bandung Zone with a landscape divided into four morphological units (Figure 2), like volcanic cones, rough relief hills, smooth relief hills and plains. The topography is relatively diverse. The northern, eastern and western areas are generally highland areas with hilly and mountainous conditions, while the southern area has a fairly steep slope.

In the research area there are active volcanoes including Guntur, Galunggung, Cikuray and Papandayan. While old volcanoes are Puntang, Kendang, Guha, Batukareta, Kamasan, Rakutak, Sanggar, Cakra, Batuipis, Martala, Katomas, Gandapura, Kancing, Pulus, Gajah, and others. Based on these conditions, the research area may be associated with magmatic activity in the volcanic environment.

Figure 1. Research Area (red box) (Anonimous, 2024)

Figure 2. Physiographic zones of West Java, namely the Batavia Coastal Plain zone, Bogor zone, Bandung zone and Southern Mountains zone (Permana, 2015)

Geologically, the Garut Regency area is composed of volcanic, sedimentary and intrusive rocks with geological structures of folds, faults and fractures (Alzwar et al., 1992). The research area is especially composed by Quaternary volcanic rocks (Figure 3), including:

- Loose Spices of Papandayan Volcano (Qhp), consisting of volcanic ash, andesite and basalt chunks.
- Young Volcanic Rocks, consisting of efflats and basaltic andesite lava flows, originating from Mount Papandayan (Qyp), Mount Cikuray (Qyc), and Mount Masigit (Qym).
- Guntur – Pangkalan and Kendang Volcanic Rocks, consisting of loose spices and andesite – basalt lava, originating from the Guntur-Pangkalan-Kendang Old Volcanic Complex (Qgpk); and Mount Kiamis (Qko).

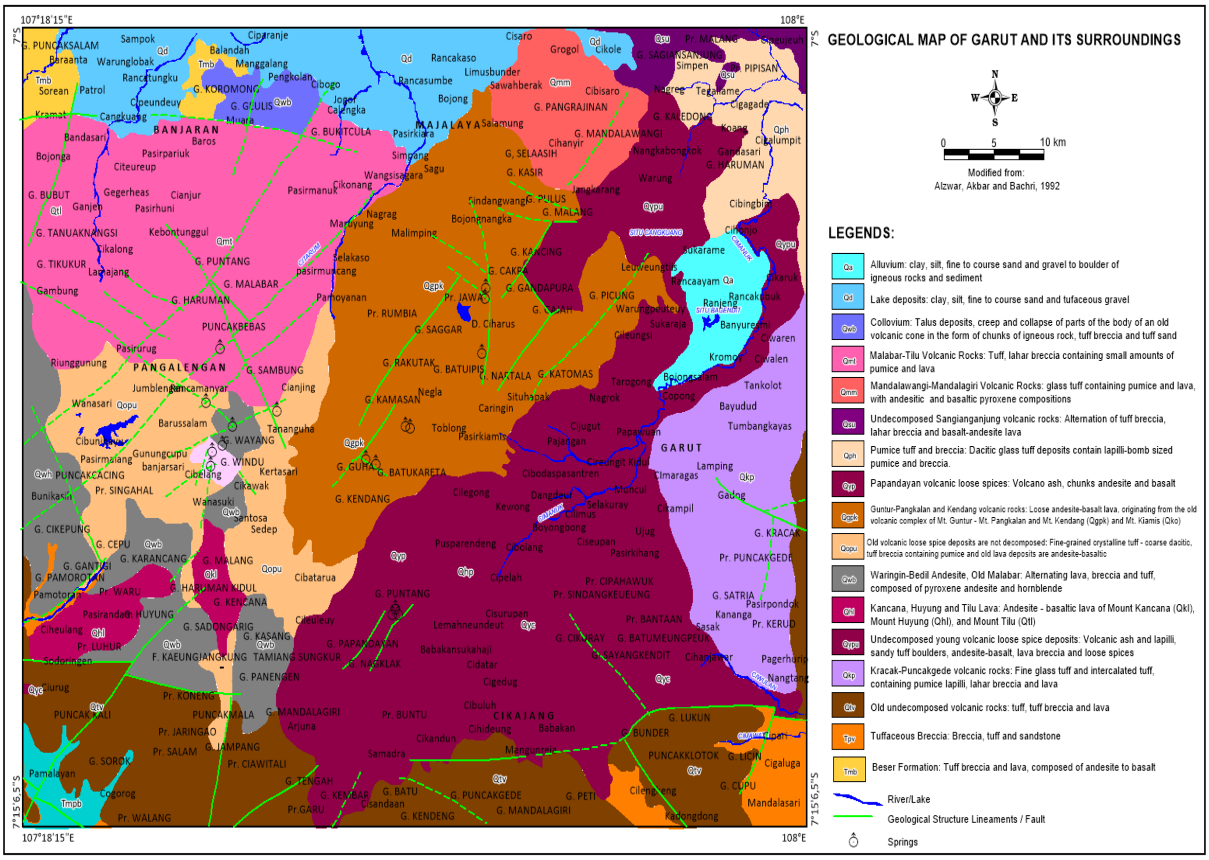

Figure 3. Geological Map of Pangalengan – Garut areas (modified from Alzwar et al., 2008)

The geological structure that developed in the research area consists of faults and lineaments with horizontal and downward movement components. Many water sources and geothermal activities were found, such as fumaroles and solfataras. In the research area, two Geothermal Power Plants (PLTP) were found, namely PLTP Kamojang and PLTP Darajat.

Based on the detailed mapping, the Pangkalan unit is associated with the Qcbi unit (Mount Cibatuipis Pyroxene andesite) on the southeast side of the lake and the Qvpjw unit (Java sand andesite) on the northwest side of the lake. While the Gandapura unit is associated with the Qvck unit (Mount Cakra Basaltic Andesite) (DEBTKE, 2017).

The oldest deposits found in the southwest, north and southeast of Darajat are andesite lava and coarse pyroclastic rocks estimated to be Plio-Pleistocene in age formed by volcanic activity of Mount Kendang (dark blue and pink shading). Furthermore, coarse pyroclastic rocks formed by volcanic activity of Rakutak are found in the north-northeast (green shading). Then andesite lava and coarse pyroclastic dominate the central part of the field as a result of volcanic activity of Gagak (maroon and light brown shading). The younger Dacite Dome intrusion is exposed in spots spread across the south, center and north of the Darajat field and the youngest rocks in the form of fine rhyolitic pyroclastic and obsidian are exposed in the northeast.

Stratigraphically, the oldest deposits in the Darajat area are estimated to be Plio-Pleistocene in age as facies A and B formed by volcanic activity of Mount Kendang which produced thick pyroclastic deposits alternating with lava flows, then in the Pleistocene facies C formed by post Kendang volcanic with similar deposit types to facies A and B. Furthermore, Gagak volcanic activity intruded older facies: A, B and C producing Facies D consisting of fine pyroclastic alternating with thin layers of lava. Facies E, whose lithology is similar to facies D, was formed during the post Gagak volcanic period (Figure 4).

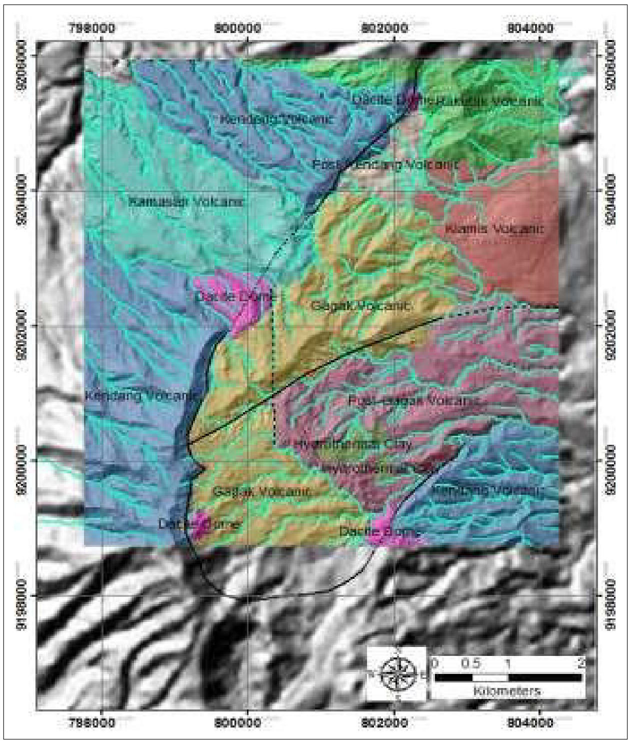

Figure 4. Stratigraphical Map of Darajat Area (DEBTKE, 2017)

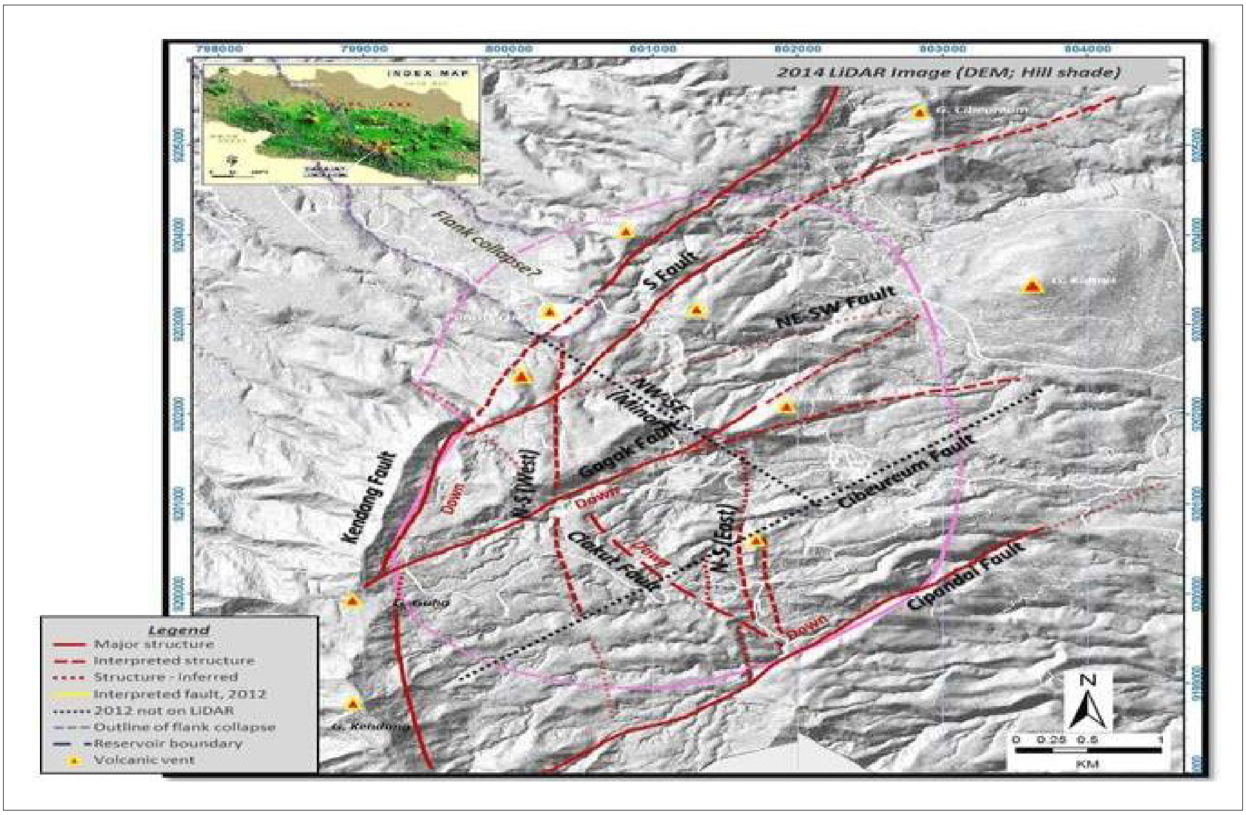

Figure 5. Geological Structural Linearity of the Darajat Area (DEBTKE, 2017)

Furthermore, Dacite lava called facies DA penetrates the Plio-Pliocene facies to form a body of Cryptodome dacite intrusion as the final stage of volcanic activity. The youngest rock is facies F in the form of fine pyroclastic deposits in the form of rhyolotic tuff formed from the volcanic activity of Mount Kiamis.

The results of the analysis and interpretation of LIDAR imagery in 2014 show that the fault structure lineaments patterns found in this area have a general trend (dominan) of northeast-southwest with other parts trending north-south and northwest-southeast. In addition to the straightness pattern, circular structure patterns (circular features) were also identified which are expressions of height such as Mount Kiamis in the northeast and Mount Kendang in the southwest.

The Kamojang geothermal system is controlled by local (volcanic) structures in the form of the Pangkalan caldera and regional (tectonic) structures trending relatively northeast-southwest and northwest-southeast. This area has several potential geological hazards such as landslides, earthquakes and volcanic eruptions. Geomorphological conditions are greatly influenced by the degree of slope gradient. The slope gradient as one of the geomorphological components of an area plays a significant role in the occurrence of soil/rock movement. Slope gradient is the inclination of the land surface with respect to the horizontal plane, commonly referred to as slope percent The slope classes can be divided as follows: nearly level (0-3%); gently sloping (1-8%); strongly sloping (4-16%); moderately steep (10-30%); steep (20-60%); and very steep (>45%); (Schoeneberger et al., 2017).

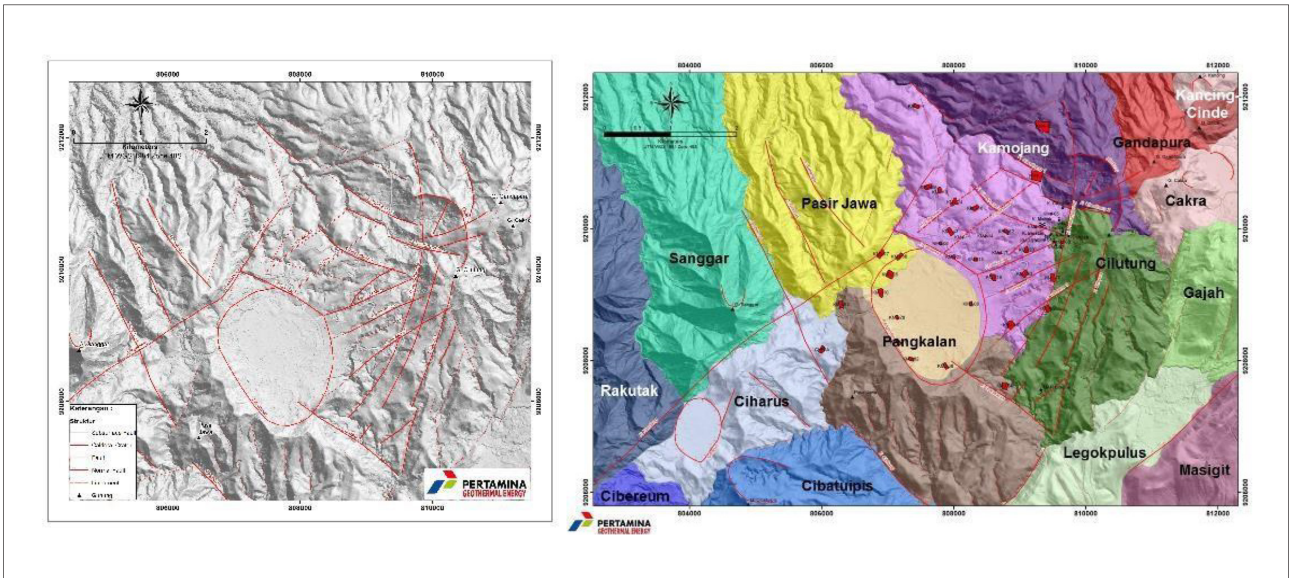

Figure 6. Geological Structural Linearity (top) and Volcanostratigraphy of the Kamojang Area (DEBTKE, 2017)

The soil types generally include alluvial soil types, andosol associations, lithosol associations, Mediterranean associations, podzolic associations, and regosol associations. The types of yellowish red podzolic soil, yellow podzolic and regosol are the most widely found in the Garut Regency area, especially in the southern part, while the northern part is dominated by andosol soil types.

Based on its history, the investigation area has experienced earthquakes with a magnitude below M5.0 many times. As happened on December 2, 2005, November 6, 2016, July 18, 2017, January 21, 2019, May 1, 2024, September 18 and December 7, 2024, with the earthquake mechanism reflecting a normal fault and a horizontal shear component trending relatively southwest - northeast (Figure 7). Based on the distribution of earthquake centers that have occurred in the Garut Regency area, which are generally concentrated in the western region, forming a straightness that coincides with the active Garsela fault line, Rakutak segment.

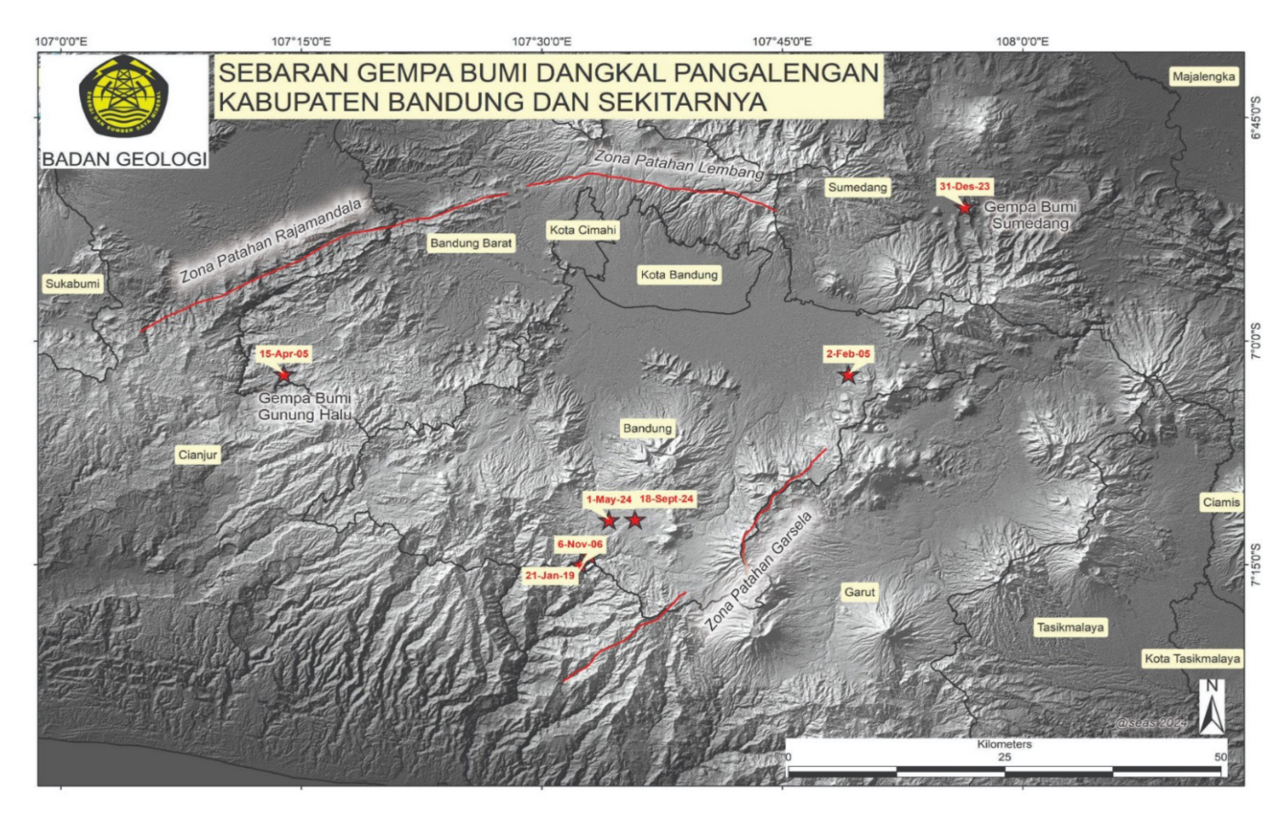

Figure 7. Location of the epicenter of the September 18 and December 7, 2024 earthquakes, as well as other earthquakes that have occurred in the research area and its surroundings (modified from Solikhin et al., 2024; BMKG, 2024a, BMKG, 2024b).

METHODS

Secondary data collection was conducted through literature studies, including: geological maps, topography, satellite images, earthquake history, and the basics of volcanoes and volcanic environments.

Fault identification was carried out using remote sensing and field verification. Remote sensing was carried out before leaving for the field, to see indications of active faults in the form of morphological lineaments and types of constituent lithology.

Visual observation and field verification was carried out to obtain data that characterizes the presence of faults, including the discovery of fracture structures, which were then measured and distinguished the types of fractures (shear and extensional). Rock offsets that characterize past earthquake events, and river diversions that form lineaments. Site class identification was carried out by microtremor measurement using seismograph.

Active fault mapping by taking aerial photos using unmanned aircraft (drones) by following a predetermined trajectory, as well as visual observations of the location. The data taken includes:

- Morphology, which is identifying the environment where the surface fractures are located
- Geology, related to the lithology of the fractures that are related to local geological processes, such as rock types, physical properties, structures and weathering levels.
- Fracture dimensions, which are measured using a measuring scale and fracture continuity dimensions which are measured using software applications.
- Land use, which is mapping land use before and around the fractures were found, by interviewing local residents

RESULTS AND DISCUSSION

The investigation in Garut Regency was conducted just after the 18 September and 7 December 2024 earthquakes, specifically in Pasirwangi District and its adjacent areas, include to Sukaresmi District and Samarang District. Identification of active faults is carried out by looking for geological traces that characterize the fault line, such as the presence of fractures, the emergence of springs, sagponds, morphological lineaments or deformation in rocks. Sagponds that are shaped like small lakes formed by the presence of depressions filled with water, are usually followed by the emergence of springs, or collections of water sources. There are several sagponds found in the investigation area, including Lakes of Ciharus, Cihurang and Cipondok.

Cihurang Lake was found at Padaawas Village, which has elongation of southwest-northeast (SW-NE) direction of about 147 m length and 60 m width (Figure 9), connected toward Ciharus Lake which has about 556 m length and 267 m width in the northeast through Ci Awi Tali water springs (Figure 10). Cihurang Lake is frequently visited by local people and visitors as a tourist destination (Figure 11).

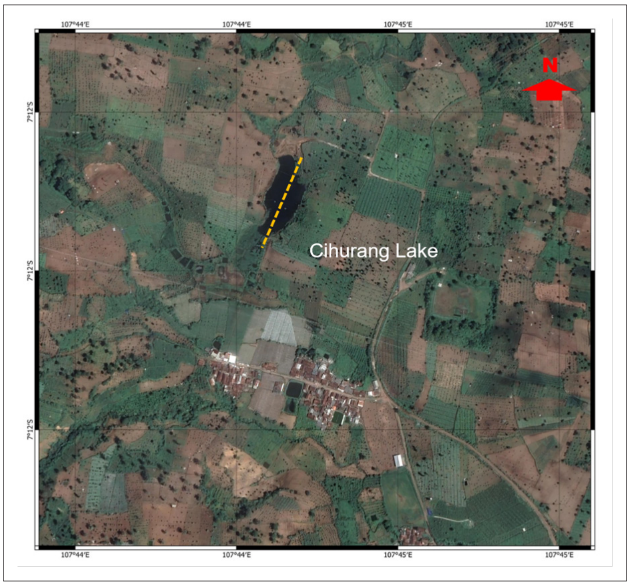

Figure 9. Elongation of Cihurang Lake (yellow dashed line) (modified from Google Earth, 2025)

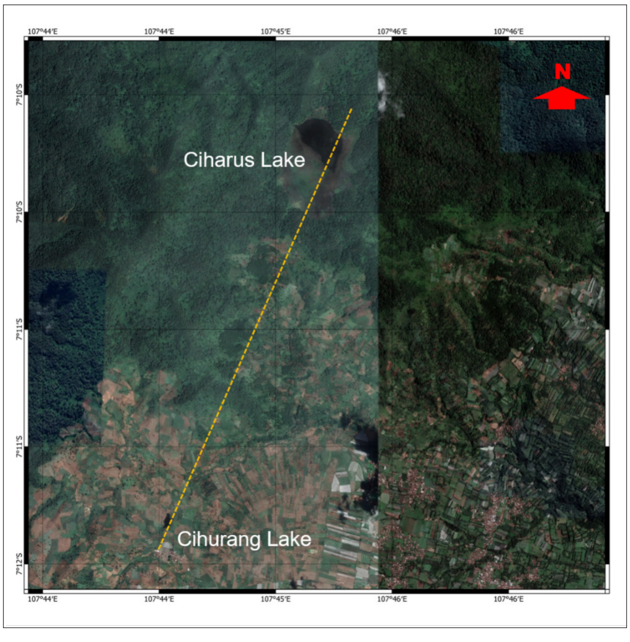

Figure 10. Lineation of Rakutak Fault Segment connecting Ciharus Lake and Cihurang Lake (modified from Google Earth, 2025)

Figure 11. Cihurang Lake as one of Tourist Destination

The down-dip fault in Pasirwangi District was observed in Sukatinggal Village, Padaawas Village, which is shown in Figure 12 (aerial photo) and Figure 13, which shows an offset and the eastern part is relatively down compared to the western part, while the down-dip fault plane is relatively north northeast - south southwest (NNE - SSW).

Figure 12. Indication of Normal Fault Lineament in Sukatinggal Village (yellow dashline)

Figure 13. Lineament of Normal Fault Indication at Padaawas Village

The second Sagpond is Situ Cipondok which is located at Patrol, Padamulya Village, Pasirwangi District. The location of Situ Cipondok is close to the Tujuh Cimanganten waterfall, or precisely at the coordinates 7.2051139°S-107.791483°E. In this location there are many springs, which are the characteristics of the active fault line. Based on the longest length of the Sagpond (elongation) has azimuth of U77°E or relatively west southwest - east northeast (WSW-ENE). The Cipondok sagpond has about 93 m length and 38 m width.

The local people named this location as Situ Ciburial (in Sundanese it means *lake which water overflows*), which indicates the presence of water coming out of the ground. Indeed, this area has a collection of springs that are partly used by the local population as their water source. The land use is for secondary crops, rice fields, and irrigation. A collection of bamboo trees was found which usually characterizes active fault lines (Figures 14, 15).

Figure 14. Situ Cipondok (Ciburial) at Kawungluwuk, Padamulya Village, Pasirwangi District

Not far from the location, there is a waterfall which is also a collection of springs that characterize the presence of an active fault. The name of this waterfall is "Curug Tujuh Cimanganten", which is one of the places visited by domestic tourists. This waterfall is included in the Kawungluwuk Village area, Padamulya Village, Pasirwangi District.

Figure 15. Lineament of Cibongkor Fault connecting Cipondok Lake and River Straightness

Based on the morphological straightness seen in the image (Figure 15), active fault mapping was conducted, starting from the Situ Cipondok sagpond to the Cikarees River, at Cibongkor, Padamulya Village, Pasirwangi District to obtain geological data and evidence, related to the presence or absence of indications of active faults in this area. At position 7.20559°S-107.793392°E, to the east of the sagpond, a fracture structure was found and showed indications of tensional joints, which have a nearly vertical slope (Figures 16). The results of fracture measurements are shown in Table 2.

Table 2. Joint Measurement data in the lineament of Cibongkor

No.	Strike/Dip	No.	Strike/Dip	No.	Strike/Dip
1.	N187°E/84°	5.	N145°E/75°	9.	N190°E/39°
2.	N287°E/75°	6.	N120°E/68°	10.	N14°E/46°
3.	N340°E/22°	7.	N125°E/40°	11.	N185°E/24°
4.	N60°E/10°	8.	N95°E/45°	12.	N205°E/71°

This measurement shows that there are four trends of joints, those are northwest –southeast (NW–SE), west northwest – east southeast (WNW – ESE), southwest – northeast (SW–NE), and south southwest – north northeast (SSW – NNE).

The next location is a tributary at the bend of the Cikarees River, Cibongkor, which is located east of Situ Cipondok. At this location, there is outcrops of tuff contain dykes filled by obsidian. Inside tuff we can see minor offset (Figure 17). Here, we found indications of geological structures that experienced strong deformation, indicated by the offset of tuff lied under alluvium bounded by the unconformity plane (Figure 18, 19).

Figure 16. Indication of faults in the form of joints on the Cibongkor Fault Line

Figure 17. Truncation river (left) obsidian-filled tuff dyke and minor offset (right)

Figure 18. Unconformity Boundary between Alluvium and Offset Tuf which has trend South Southwest - North Northeast

Figure 19. Identification of active fault indications on the Cibongkor Fault Line

There are several hypotheses regarding the process of obsidian formation in a dyke, such as magma penetrates the rock layer and forms a dyke; Cracks or gaps occur in the rock layer due to pressure within the earth, then magma fills the cracks, due to rapid cooling, magma solidifies into obsidian which fills the entire space in the dyke. The other possibility is when obsidian fills the dyke along with the offset; when dykes formed during magma intrusions cut through existing rock, the magma cools quickly forms obsidian in the dyke. According to the field observation and layer stratigraphic position, the possible scenario is when intrusion formed a dyke filling by obsidian, then fault occured and forms the offset, after that, alluvium settle as younger deposit lied above a discontinuity.

Strong deformation on rocks observed at base of surface rupture in Barusari village, an offset found with strike of N 210° E and dip of 34°. In this area, joints are measured as follows (Table 3).

Table 3. Joints measurement data at Barusari

No.	Strike/Dip	No.	Strike/Dip	No.	Strike/Dip
1.	N130°E/78°	5.	N110°E/62°	9.	N210°E/34°
2.	N15°E/84°	6.	N279°E/44°	10.	N65°E/28°
3.	N153°E/70°	7.	N160°E/67°	11.	N205°E/71°
4.	N330°E/69°	8.	N153°E/66°	12.	N285°E/43°

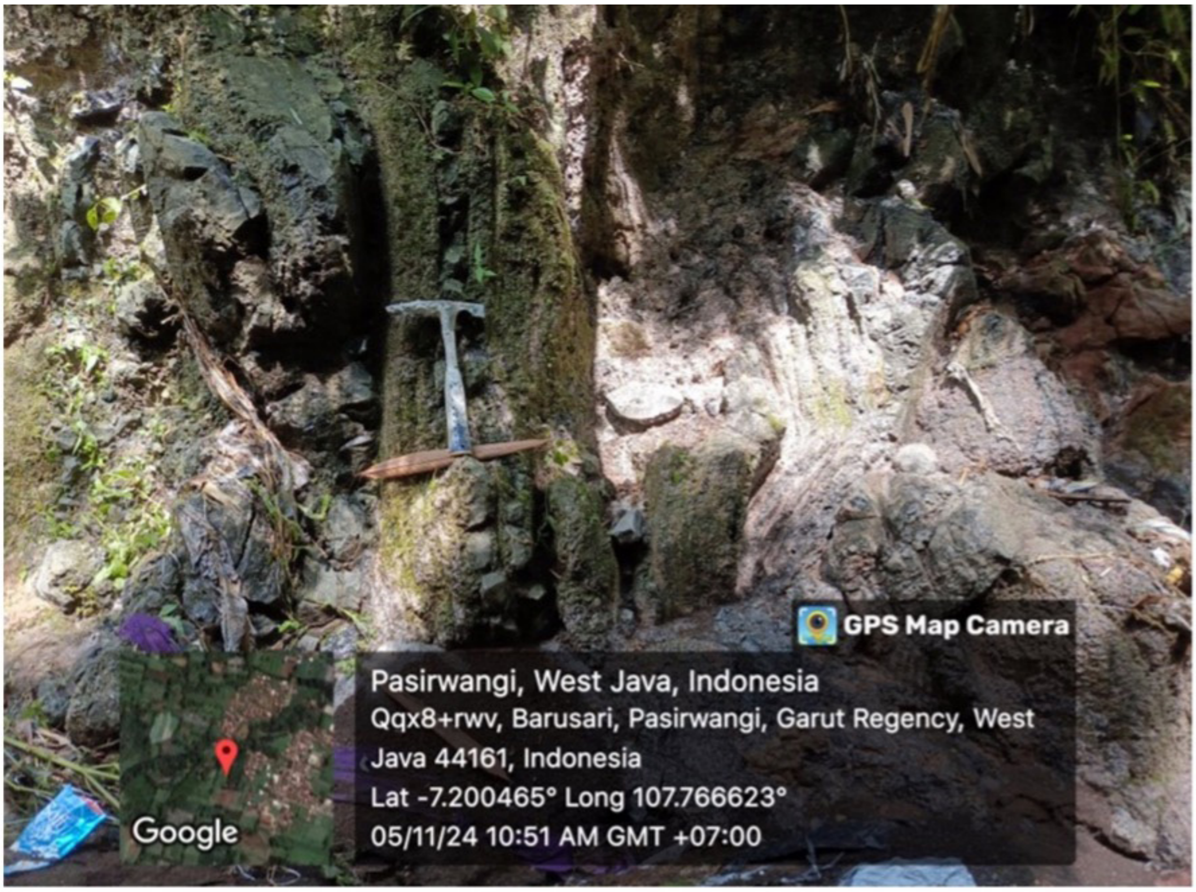

Figure 20. Indication of Strong Deformation at Barusari Village

We did measurement of joints at Ciendog hot springs, showing trends of southwest – northeast (SW-NE), northwest – southeast (NW-SE) and East – West (E-W).

Table 4. Joints Measurement data at Ciendog

No.	Strike/Dip	No.	Strike/Dip	No.	Strike/Dip
1.	N128°E/60°	7.	N115°E/65°	13.	N142°E/69°
2.	N23°E/64°	8.	N43°E/86°	14.	N97°E/12°
3.	N103°E/51°	9.	N40°E/39°	15.	N331°E/65°
4.	N6°E/39°	10.	N6°E/44°	16.	N348°E/73°
5.	N10°E/21°	11.	N32°E/69		
6.	N149°E/57°	12.	N93°E/48°		

The morphological lineaments and indication of active faults such as assembly of springs, hot springs, sag ponds, joints and offsets found in the area of Pasirwangi District and its surroundings, indicates that there is a source of earthquake generation in this region. The results shows that the area of Pasirwangi District area is vulnerable to the geological disasters, which threaten the survival of the people living in the area (Figure 21).

The results of microtremor measurements show that the dominant frequency value of the research area ranges from 1 - 4 Hz, or a dominant period of 0.25 - 1 second. The amplification value of earthquake shocks is between 3 - 7, which means that if an earthquake occurs, this area can experience an amplifying of shocks up to 7 times. While the S wave speed at a depth of 30 m is between 233 - 545 m / second. The sediment thickness ranges from 25 - 64 m, and the land type is Class C (Hard Soil) and Class D (Moderate Soil) (Table 5).

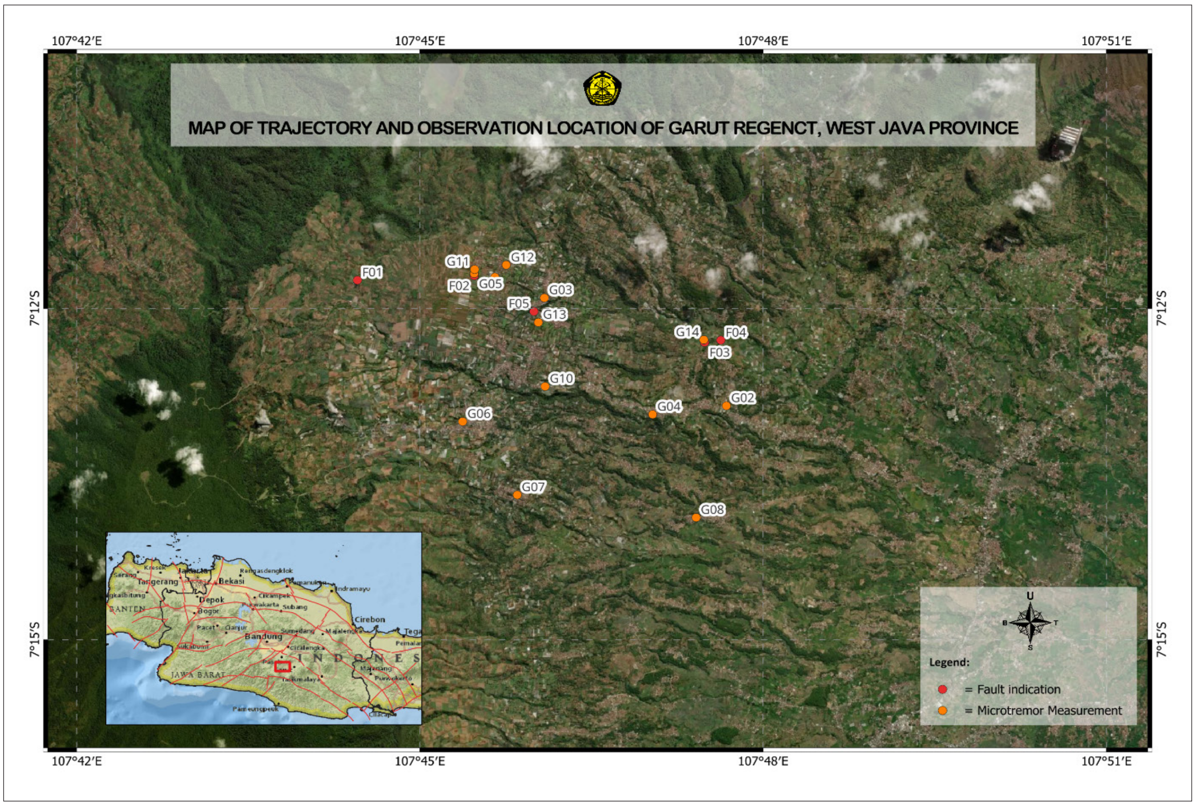

Figure 21. Map of trajectory and observation location of Garut Regency West Java Province

Table 4. Joints Measurement data at Ciendog

ID	Lat (°S)	Long (°E)	Location	FDOM (Hz)	Amplitude Amplification	Vs30 (m/sec)	Sediment Thickness (m)	Site Class
G02	7,214682	107,794658	Sirnajaya	0,91	2,92	233,324	64,1	D
G03	7,198395	107,768139	Barusari	2,12	3,7	236,081	27,84	D
G04	7,215988	107,783912	Pasirwangi	0,97	6,78	242,895	62,6	D
G05	7,194718	107,757918	Sukatinggal	2,3	3,19	237,77	25,84	D
G06	7,217071	107,756238	Sirnamukti	3,7	3,84	545,657	36,87	C
G07	7,22814	107,76419	Talaga	2,42	7,06	248,057	25,62	D
G08	7,231557	107,790249	Pasir Kiamis	1,31	4,53	237,358	42,3	D
G09	7,195262	107,760938	SDN 3 Barusari	2,96053	5,86236	294,924	24,9	D
G10	7,211764	107,768249	Padaawas	2,38738	4,08511	238,472	24,97	D
G11	7,1941033	107,75798	Panggilingan	2,50556	3,59084	227,029	22,65	D
G12	7,1934304	107,76258	Neglasirna	2,26407	3,21963	338,755	37,40	D
G13	7,2020952	107,76726	Lapangan Barusari	2,02915	3,85541	341,314	42,05	D
G14	7,2047206	107,79137	Cimanganten, Padamulya	2,10163	3,87844	373,575	44,44	C

CONCLUSION

The Pasirwangi District and its surroundings, is located in a volcanic environment and is traversed by active faults, such as The Rakutak Segment of Garsela Fault which has relatively northwest-southeast (NW-SE) in direction, Padaawas down dip fault which has trend south southwest – north northeast (SSW-NNE), and Cibongkor Fault which has trend of west southwest - east northeast (WSW-ENE). These local active faults are crossing the research area, which in the future could become source of earthquakes.

The emergence of both cold and hot springs is evidence of fractures on the surface of the earth, some of which conduct heat from within the earth through solutions (water) and change the mineral composition of the rocks they pass through.

Fault lines are weak zones, which have the potential to experience movement that can cause damage to land and buildings nearby, so it is best to avoid settlement too close to fault lines and surface fractures.

The existence of active faults, such as the Rakutak Segment, Padaawas and the Cibongkor Fault, which can be sources of earthquakes, so that the community needs to be aware of earthquake shocks, especially those located close to fault lines. A fault is a part of the earth’s crust that is torn and has the potential to move and can sometimes trigger an earthquake. The fault lanes are weak zones that have potential to experience more severe impacts than its surroundings. The area of Pasirwangi District and its surroundings has some local faults could have special attention, related to mitigation efforts and handling the impacts of geological disasters, both structural (physical/land) and non-structural (regulations).

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