

Adaptation Of Climate Change In Cimangeunteung Village Lebak District In The Framework Of Improving Regional Resilience

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Abstract

Climate change causes an increase in the incidence of natural disasters which, if not handled seriously, will threaten regional resilience. Lebak Regency is one of the areas in Indonesia which is not spared from the impacts of climate change. In 2019 there were many drought disasters in Lebak Regency, but there was one village that was not affected by drought, namely Cimangeunteung Village. This becomes interesting for further research by researchers. The data was taken based on the results of interviews, observations, and documents using the interactive model qualitative research methods belonging to Miles, Huberman, and Saldana (2014). The purpose of this study is to determine the impact of climate change on potential disasters in Lebak Regency and to analyze the adaptation efforts made by the people of Cimangeunteung Village. The results of this study are 1) Climate change has caused the number of disasters due to climate change such as floods, droughts and landslides to increase in Lebak Regency. 2) The implementation of fostering climate change adaptation in Cimangeunteung Village is carried out through the activity of creating a waste bank; construction of walls of spring wells; and the formation of the Women Farmers Group. Climate change adaptation activities in Cimangeunteung Village have been well implemented and have succeeded in increasing public awareness in caring for the environment. Routine monitoring by the Lebak local government of Cimangeunteung Village is still being carried out to date.

Keywords: *Climate Change, Climate Change Adaptation, Cimangeunteung Village, Lebak Regency, Regional Resilience*

INTRODUCTION

The Law of the Republic of Indonesia No. 43 of 2008 concerning State Territories explains that the territory of the Unitary State of the Republic of Indonesia (NKRI) is one of the elements of the state which is a unified land area, inland waters, archipelagic waters and territorial sea along with the seabed and soil beneath it, as well as the airspace above it, including all sources of wealth contained therein. It is necessary to increase regional resilience to protect the territory of the Unitary State of the Republic of Indonesia from various threats. The emergence of a threat in an area can disrupt the safety, peace, and welfare of the people in that region. Therefore, the government has an obligation to improve and maintain the resilience of its territory.

The threat to the environmental sector that is currently being faced by the entire world community is climate change. Climate change is a condition in which changes or shifts in normal weather patterns are experienced by all countries in the world over a long period of time (Susan Stone and Chacon Mario, 2010). Climate change is actually a natural phenomenon and will definitely occur on earth, the process of change tends to run slowly, but because currently human activities on earth are increasing, this triggers climate change to become faster and more extreme compared to decades. the previous decade.

One of the activities used as the main instrument in dealing with the threat of climate change is through adaptation. Republic of Indonesia Law Number 32 of 2009 Article 27 explains that climate change adaptation is an effort made to increase the ability to adapt to climate change, including climate diversity and extreme climate events so that potential damage due to climate change is reduced, opportunities posed by climate change can be exploited, and the consequences arising from climate change can be overcome. Through adaptation to climate change, society can be more resilient in dealing with the impacts of climate change.

The impact of climate change can cause natural disasters, natural disasters due to climate change that are expected to occur in Indonesia, drought, floods, forest fires, coral bleaching, sea level rise, and extreme weather, including storms that can damage natural and artificial systems in an area. (WWF Indonesia, 2009). The impact of climate change directly affects the life of living things. Climate change has an impact on biodiversity, clean water sources, and the economy of a country where as a result of climate change the lives of people whose livelihoods depend on natural resources and services are disrupted (WWF Indonesia, 2009). In Indonesia, one of the areas affected by drought as a result of climate change is the Lebak Regency, Banten Province.

The long dry season that hit Banten Province in 2019 caused the Cidengdong River to experience drought. The Cidengdong River is a source of water supply that irrigates the rice fields in Sajira District, Lebak Regency, Banten Province. Drought has also hit the Cisangu River area in Cibadak District, Lebak Regency, Banten Province. Situ Cijiro, which irrigates hundreds of hectares of rice fields in Rangkasbitung District, also experienced drought in 2019. The long drought that occurred in Lebak Regency caused the water discharge for rice field irrigation to decrease drastically. The long dry season caused an area of 2,760 hectares of rice fields in Lebak Regency to be affected by drought. Data from the Drought Post of the Agriculture and Trade Service (Distanbun) of Lebak Regency noted that 1,984 hectares of rice fields experienced mild drought, 441 hectares of rice fields experienced moderate drought, and 335 hectares of rice fields experienced severe drought.

When the 2019 drought disaster occurred, there was one village that had rice fields but was not affected by the drought, namely Cimangeunteung Village. Cimangeunteung Village is located in Rangkasbitung District. Even though in 2019 Situ Cijoro, which is the source of water for hundreds of hectares of rice fields in Rangkasbitung District, experienced a drought, this did not affect the rice fields in Cimangeunteung Village. Before the mass drought in Lebak Regency in 2019 occurred, the people of Cimangeunteung Village together with the local government of Lebak Regency, namely the Lebak Regency Environmental Service, had made efforts to adapt to climate change. This adaptation effort then resulted in the release of Cimangeunteung Village from the 2019 drought.

RESEARCH METHODS

In this study, researchers used qualitative research methods with descriptive research types to find out how climate change adaptation efforts were carried out by the Regional Government and the community in Cimangeunteung Village, Lebak Regency in order to increase regional resilience. According to Creswell, qualitative research is a complex process where this research analyzes words and detailed reports from the point of view of sources and research is carried out in natural situations (Creswell, 2014). Therefore, a qualitative approach is needed which is not only limited to numerical data but also to writings and speeches that are able to explain this phenomenon in greater depth. The data used in this study were obtained based on the results of interviews, field observations, and documents.

RESULT AND DISCUSSION



Figure 1. Map of Lebak Regency
Source: Local Government of Lebak Regency (2022)

Lebak Regency has an area of 3,305.07 km²/sq.km which consists of 28 sub-districts and 345 villages. The administrative center of Lebak Regency is located in the Regency Capital, namely Rangkasbitung District, which is located in the northern region. Geographically, Lebak Regency is located at 105 25' – 106 30 East Longitude and 6 18' – 7 00' South Latitude. Astronomically, Lebak Regency is located between 06007'18" and 07000'00" South Latitude, and 105000'25" and 106000'30" East Longitude. The northern part of Lebak Regency is lowland, the southern part of Lebak Regency is mountainous with a peak, namely Mount Halimun, the southeastern tip of Lebak Regency is the Ciujung River which flows north and is the longest river in Banten Province.

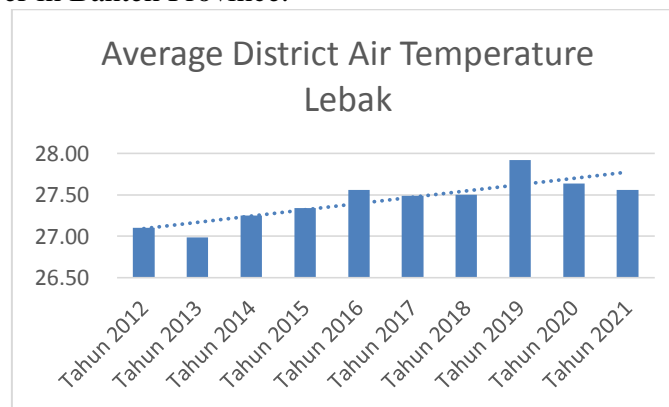


Figure 2. Diagram of Average Air Temperature in Lebak Regency for 2012-2021
Source: BPS Lebak Regency (Processed by Researchers)

Based on the diagram above, it can be seen that the average air temperature in Lebak Regency always changes every year, this can be seen from the trend line which tends to rise from 2012 to 2021. In one decade, from 2012 to 2021, the average air temperature ranges from 26.99°C to 27.92°C. When compared between 2012 and 2021, currently the average air temperature in Lebak Regency has increased, which means that the air temperature in Lebak Regency tends to get hotter.

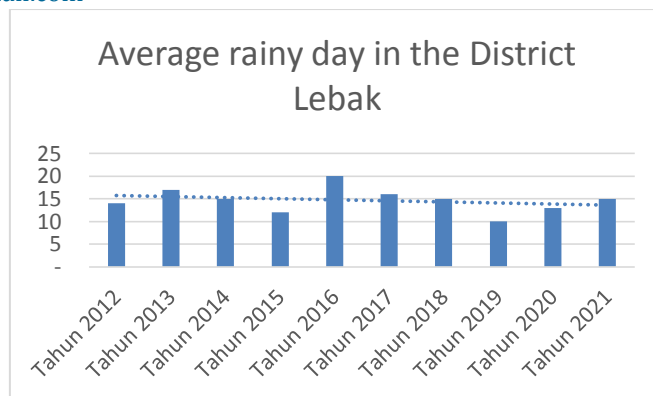


Figure 3. Diagram of Average Rainy Days in Lebak Regency for 2012-2021
 Source: BPS Lebak Regency (Processed by Researchers)

Based on the diagram above, it can be seen that the average rainy day in Lebak Regency has a different increase and decrease every year. However, in one decade, from 2012 to 2021, the average rainy day in Lebak Regency tends to decrease. This is evidenced by the trend line which tends to decrease from 2012 to 2021. In Lebak Regency, the average number of rainy days during the period 2012 to 2021 ranges from 10 to 20 days.

Cimangeunteung Village is located in Rangkasbitung District, has an area of 1,066 hectares. To the north Cimangeunteung Village is bordered by Nameng Village, to the east by Citeras Village, to the south by Sindang Mulya Village, and to the west by Narimbang Mulya Village. Based on the Cimangeunteung Village Monograph Data for 2023, the population of Cimangeunteung Village is 5,710 people, with the distribution of the population based on gender as many as 2,957 men and 2,753 women. Agriculture is one of the sources of natural wealth owned by Cimangeunteung Village. There are 82 hectares of rice fields in Cimangeunteung Village, this is in line with the majority of the livelihoods of the people of Cimangeunteung Village who work in agriculture. A total of 251 people work as farmers and 952 people work as casual farm laborers. The agricultural sector is a supporter of the economic life of the majority of the people of Cimangeunteung Village

Disaster Potential Due to Climate Change in Lebak Regency

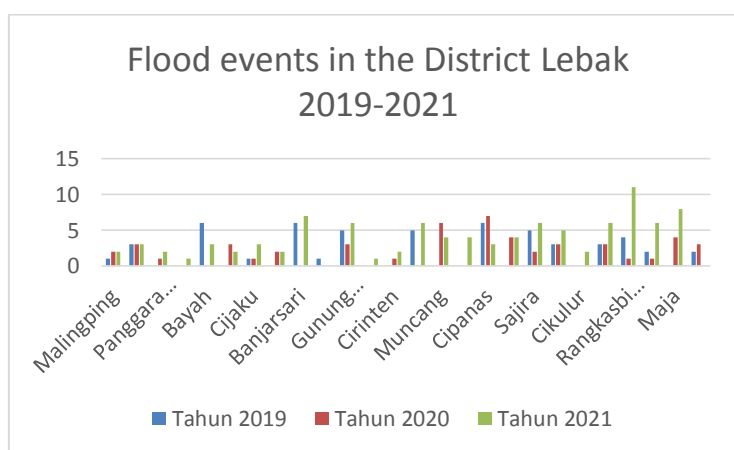


Figure 4. Diagram of Flood Events in Lebak Regency for 2019-2021
 Source: Processed by Researchers Based on BPS Lebak Regency (2022)

Data processing of flood disasters in Lebak Regency from 2019 to 2021 resulted in 2019 there were 53 flood events, in 2020 there were 50 flood events, and in 2021 there were 99 flood events spread across 28 sub-districts in Lebak Regency. Flood disasters in Lebak

Regency do not occur in all sub-districts every year. If seen based on the diagram above, Rangkasbitung District is the area with the most drastic increase in flood events from 2019 to 2021. In 2021, the most floods in Lebak Regency occurred in Rangkasbitung District, namely 11 times.

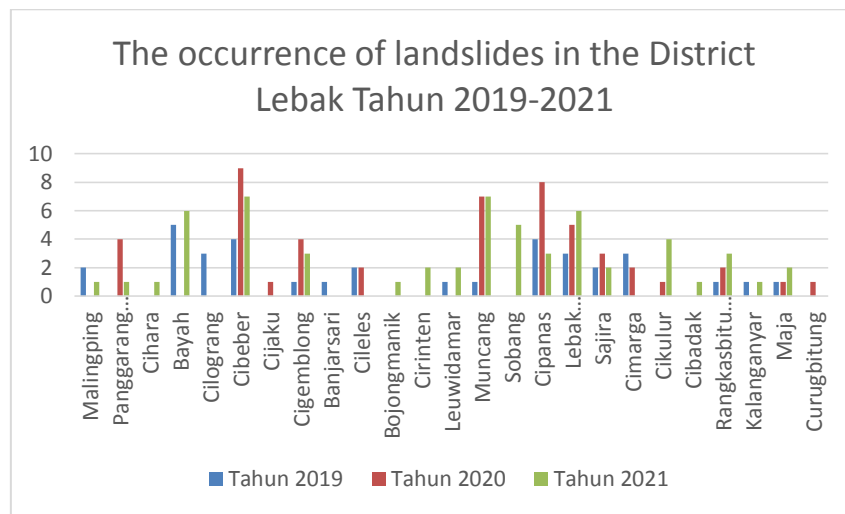


Figure 5. Diagram of Landslide Events in Lebak Regency for 2019-2021
Source: BPS Lebak Regency (Processed by Researchers)

The topographical conditions of Lebak Regency and the number of rainy days that are not stable make Lebak Regency vulnerable to landslides, especially in the South and East regions. Data processing of landslides from 2019 to 2021 in Lebak Regency resulted in 35 landslides in 2019, 50 landslides in 2020, and 58 landslides in 2021. The Cibeber District is the area where landslides frequently occur in Lebak Regency. In Rangkasbitung Subdistrict, there are not too many landslides, but for sure the number is always increasing every year.

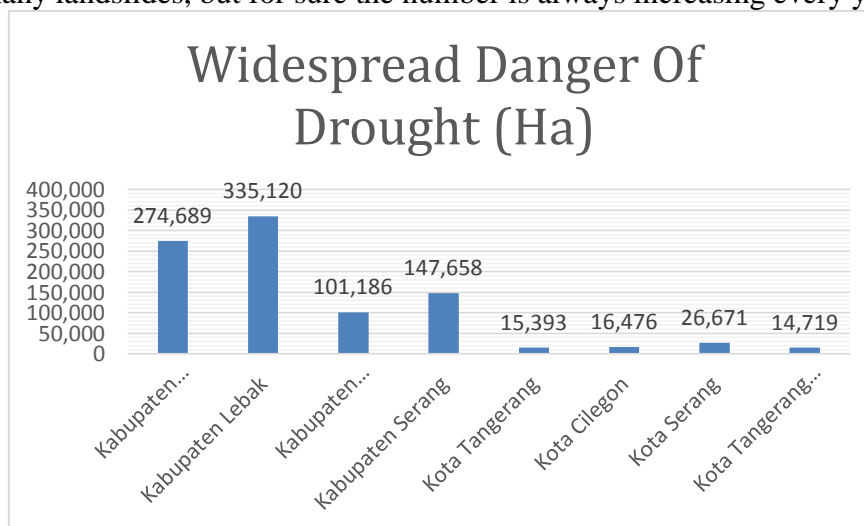


Figure 6. Diagram of Potential Area of Drought Hazard in Banten Province
Source: Processed by Researchers Based on SIPD Banten Province (2021)

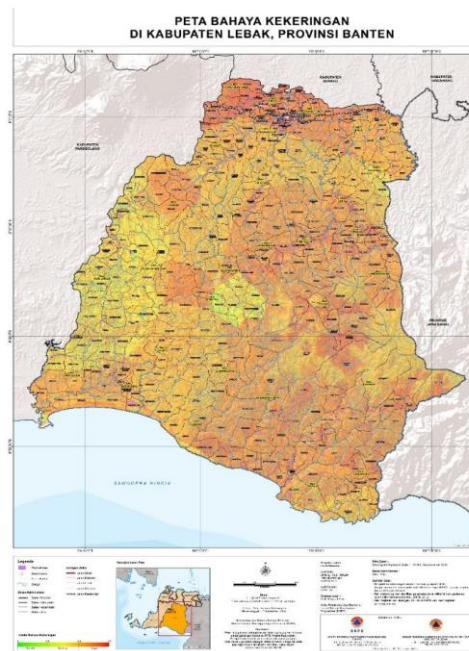


Figure 7. Drought Hazard Map in Lebak District
Source: National Disaster Management Agency

Based on Figure 6, it can be seen that Lebak Regency is an area with the highest drought hazard in Banten Province. SIPD data for Banten Province in 2021 records that the area at risk of drought in Lebak Regency reaches 335,120 hectares. The majority of the people of Lebak Regency work in the agricultural sector. The high drought hazard area can certainly threaten and affect the lives of the people of Lebak Regency, especially those working in the agricultural sector. Based on figure 7 of the drought hazard map in Lebak Regency obtained from the InaRisk Website by the National Disaster Management Agency, it shows that the Lebak Regency area is in the medium to high category in the drought disaster hazard. The orange color represents high condition and the yellow color represents medium condition. The map above shows that almost the entire area of Lebak Regency is colored orange, meaning that almost all of Lebak Regency is in the high category of drought hazard, only a few areas are in the medium category.

If the community continues to live in threats and danger, it can affect regional resilience. Territorial resilience seeks to guarantee the integrity, identity and survival of the Indonesian nation based on Pancasila and the 1945 Constitution and the struggle to achieve national goals. The national goal of the Indonesian nation is written in the 4th paragraph of the Preamble to the 1945 Constitution, namely protecting the entire Indonesian nation and all of Indonesia's bloodshed; Promote the general welfare; Enrich the life of a nation; and Participate in carrying out world order based on freedom, eternal peace, and social justice. Efforts to increase regional resilience are in line with the national goals of the Indonesian nation, climate change is a threat that must be handled appropriately and responsively because the impact of climate change can threaten the safety and welfare of society.

Implementation of Climate Change Adaptation in Cimangeunteung Village

The implementation of climate change adaptation in Indonesia is adapted to the main disaster threats that occur due to climate change, namely floods and droughts. Therefore, most efforts to adapt to climate change in Indonesia focus on preventing floods and droughts (Dreierstad, 2018). The implementation of fostering climate change adaptation in Lebak

Regency was initiated by the Banten Province Environment and Forestry Service and the Lebak Regency Environmental Service. Activities in fostering climate change adaptation are carried out on an ongoing basis based on the community (community based). The main objective in carrying out activities in fostering climate change adaptation in Lebak Regency is to create a community that can utilize its environment in an efficient manner and can manage the environment in a sustainable manner.

Climate change adaptation development in Cimangeunteung Village has been carried out since 2018. In the early stages of coaching, the community is provided with information and learning about climate change and its impacts, efforts that can be made in climate change adaptation, activities to be carried out in Cimangeunteung Village, and how to manage these activities. After the learning period is over, next is the implementation of climate change adaptation activities. During the mentoring period, DLHK Banten Province and DLH Lebak routinely conducted field visits and monitoring in Cimangeunteung Village.

Based on data that has been processed and analyzed by researchers, the implementation of climate change adaptation coaching in Cimangeunteung Village has gone very well and provided great benefits for the lives of the people of Cimangeunteung Village. The implementation of fostering climate change adaptation in Cimangeunteung Village involves the role and active participation of the village community. Based on research that researchers have conducted, in recent years there have been no disasters due to climate change such as floods, landslides, or droughts that have occurred in Cimangeunteung Village. In addition to regional topographical conditions and resources, the implementation of climate change adaptation guidance which has been implemented since 2018 has provided additional knowledge to the people of Cimangeunteung Village so that the community has made various efforts to prevent disasters from occurring. The implementation of climate change adaptation coaching also has a significant effect on the lifestyle of the people of Cimangeunteung Village. The activities carried out during climate change adaptation coaching in Cimangeunteung Village are:

a) Creating a Garbage Bank

The Garbage Bank as one of the activities initiated in fostering climate change adaptation has succeeded in creating the behavior of the people of Cimangeunteung Village who care more about the environment. The Garbage Bank changes people's lifestyles to become more disciplined in disposing of waste. The community also has knowledge in sorting and disposing of waste. Climate change adaptation coaching affects the mindset of the people of Cimangeunteung Village, who currently prefer to collect garbage instead of throwing it away carelessly.

Garbage that has been collected by the community is then handed over to the waste bank to get money. The people of Cimangeunteung Village call this activity "nabung sambah". The money obtained from the waste bank becomes savings and additional income for the people of Cimangeunteung Village. The waste bank also has a significant effect on the cleanliness of Cimangeunteung Village, especially the Drainage area which is currently free of plastic waste. Until now, the Garbage Bank is still being implemented in Cimangeunteung Village.

b) Formation of Women Farmers Group and Garden Care

Another activity carried out in the implementation of climate change adaptation coaching in Cimangeunteung Village is the formation of the Women Farmers Group (KWT). KWT has the task of managing collective gardens that are established on the land of residents who voluntarily give their land to build a shared garden. In garden management activities, Banten Provincial DLHK and Banten Regency DLH are tasked with providing plant seeds and fertilizer, then KWT has the task of managing the plantation. The harvest from the garden can be shared by the Cimangeunteung Village community free of charge. However, due to the change in village head, currently the

plantations that have been managed by KWT are no longer being managed because they will be moved to a new plantation area.

c) Construction of the Wall of the Spring Well

In terms of physical development, in the climate change adaptation development activities in Cimangeunteung Village, a wall was built for the spring wells and repairs to the water intake located at the Ciparada Village spring well. This spring well can be used free of charge by the people of Cimangeunteung Village. Until now the springs are still well maintained and people still use the water for various purposes such as irrigating rice fields, bathing, washing, and cooking.

Active guidance regarding the implementation of climate change adaptation activities carried out by DLHK Banten Province and DLH Lebak Regency in Cimangeunteung Village has been completed in 2020. The Cimangeunteung Village community is considered capable of implementing climate change adaptation efforts, therefore further guidance will be implemented in other villages. Until now DLHK of Banten Province and DLH of Lebak Regency are still conducting monitoring, but only monitoring because the key to the success of activities in fostering climate change adaptation is the Cimangeunteung Village community itself. The implementation of climate change adaptation in Cimangeunteung village has increased public awareness to care for the environment in order to face the threat of disasters due to climate change.

CONCLUSION

Changes to climate change variables such as air temperature and the number of rainy days in Lebak Regency have an impact on increasing the number of disasters in Lebak Regency. Disasters due to climate change that occurred in Lebak Regency were floods, droughts and landslides. In 2019 there were 53 flood disasters, in 2020 there were 50 times, and in 2021 it increased to 99 times. While the occurrence of landslides in 2019 occurred 35 times, in 2020 there were 50 times, and in 2021 it increased to 58 landslides. In 2021, drought in Lebak Regency occupies the highest position in the drought hazard in Banten Province, namely 335,120 hectares of drought hazard land. Based on the drought hazard map issued by BPBD on the InaRisk website, Lebak Regency is in the moderate to high category of drought hazard.

Climate change adaptation efforts carried out by the Regional Government and the people of Lebak Regency through climate change adaptation coaching have been carried out well in Cimangeunteung Village. Efforts made to control floods, droughts and landslides, as well as other activities related to efforts to increase adaptation to climate change have been carried out with the active participation of the people of Cimangeunteung Village. The implementation of climate change adaptation coaching in Cimangeunteung Village has succeeded in creating a new lifestyle for the people of Cimangeunteung Village. The implementation of fostering climate change adaptation in Cimangeunteung Village, Rangkasbitung District, Lebak Regency includes activities to build a waste bank, form a Women's Farmer Group, create a garden, and build a spring wall.

REFERENCES

- Antaraneews.com (2019). “2.760 Hektare Sawah di Lebak Kekeringan, Khawatir Gagal Panen Meluas”. Retrieved from <https://pon.antaraneews.com/berita/1001010/2760-hektare-sawah-di-lebak-kekeringan-khawatir-gagal-panen-meluas> diakses pada 18 Juli 2022.
- Antaraneews.com (2019). “Petani Pasrah Kekeringan di Lebak Timbulkan Gagal Panen”. Retrieved from <https://banten.antaraneews.com/berita/52394/petani-pasrah-kekeringan-di-lebak-timbulkan-gagal-panen> diakses pada 18 Juli 2022.
- Antaraneews.com (2019). “Ribuan Hektare Sawah di Kabupaten Lebak Kekeringan!”. Retrieved from <https://banten.antaraneews.com/berita/52220/ribuan-hektare-sawah-di-kecamatan-lebak-kekeringan> diakses pada 18 Juli 2022.
- Biro Pemkesra Provinsi Banten. “Profil Kabupaten Lebak”. Retrieved from [biropemerintahan.bantenprov.go.id:https://biropemerintahan.bantenprov.go.id/profil-kabupaten-lebak](https://biropemerintahan.bantenprov.go.id/https://biropemerintahan.bantenprov.go.id/profil-kabupaten-lebak) diakses pada 20 Juli 2022.
- Katadata.co.id. (2019). “Kemarau Panjang, 454 Hektare Lahan Sawah di Lebak Gagal Panen”. Retrieved from <https://katadata.co.id/agustiyanti/berita/5e9a4e6ccb3dc/kemarau-panjang-454-hektare-lahan-sawah-di-lebak-gagal-panen> diakses pada 22 Juli 2022.
- Badan Pusat Statistik Kabupaten Lebak. (2022). Kabupaten Lebak dalam Angka. Lebak: BPS Kabupaten Lebak.
- Dinas Lingkungan Hidup Kabupaten Lebak. (2022). Ringkasan Eksekutif: Dokumen Informasi Kinerja Pengelolaan Lingkungan Hidup Daerah Kabupaten Lebak Tahun 2022. Lebak: Dinas LH Kabupaten Lebak.
- Republika.co.id. (2019). “Sawah Dilanda Kekeringan, Petani di Lebah Hanya Bisa Pasrah”. Retrieved from <https://sindikasi.republika.co.id/berita/pvi31o458/sawah-dilanda-kekeringan-petani-di-lebak-hanya-bisa-pasrah> diakses pada 20 Juli 2022.
- Stone, S., And Mario, C. (2010). Climate Change and the Role of Forest. Retrieved from https://www.researchgate.net/publication/259175760_Climate_Change_and_the_role_of_forest_A_community_Manual_Published_by_Conservation_International diakses pada 23 Juli 2022.
- Sugiyono, P. D. (2016). Metode Penelitian Kualitatif, Kuantitatif, dan R&D. Bandung: Alfabeta.
- UNFCCC. (2007). “Climate Change 2007”. Retrieved from https://unfccc.int/files/meetings/cop_13/press/application/pdf/sekilas_tentang_perubahan_iklim.pdf diakses pada 30 Juli 2022.
- UNFCCC. “Sekilas tentang Perubahan Iklim”. Retrieved from https://unfccc.int/files/meetings/cop_13/press/application/pdf/sekilas_tentang_perubahan_iklim.pdf diakses pada 30 Juli 2022.
- WWF Indonesia. (2009). “Pulau Lombok di Indonesia dan Langkah Awal untuk Beradaptasi terhadap Dampak dari Perubahan Iklim”. Retrieved from <https://www.wwf.or.id/?13420/Langkah-Awal-Beradaptasi-terhadap-Dampak-Perubahan-Iklim-di-Pulau-Lombok> diakses pada 30 Juli 2022.
- WWF Indonesia. “Tentang Iklim dan Energi”. Retrieved from https://www.wwf.or.id/tentang_wwf/upaya_kami/iklim_dan_energi/solusikami/kampanye/powerswitch/spt_iklim/ diakses pada 31 Juli 2022.
- World Neighbors. (2015). Arahan Program Kerjasama World Neighbors dengan Kementerian Lingkungan Hidup dan Kehutanan Periode 2015-2018. Bali: World Neighbors.