

# Mapping of Food Security Based on Natural Disaster Mitigation in Serang Regency, Banten Province, Indonesia

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## Abstract

Natural disasters are one of the threats to food security in every region in Indonesia. Serang Regency is one of the areas in Indonesia that is prone to natural disasters. One of the sectors most impacted by this disaster is the agricultural sector, because this agricultural sector determines food security in the area and can affect the socio-economy of the local community. Therefore, this research is interested in making a food security mapping based on natural disaster mitigation in Serang Regency. This is done as an effort to mitigate natural disasters in analyzing and determining policies to minimize the risk of disasters that will occur. The method used in this research is the mix method with quantitative and qualitative approaches. Based on the results of the analysis, it was found that Serang Regency has a moderate trend of food security where there are 136 villages (42%) with a level of Little Food Vulnerability, 116 villages (35%) at the Food Resistant level and 28 villages (9%) at the Very Food Resistant level. Villages with food insecurity being the first priority (Very Vulnerable to Food) were 5 villages (2%) and 40 villages (12%) were at the Food Vulnerability level. This shows that it is not yet at the very food resistant level. However, food security in Serang Regency continues to increase. This is indicated by the existence of grocery stores, food stores and restaurants as a means of marketing agricultural products which continue to increase every year. In this case, the mitigation efforts undertaken by the government are appropriate and need to be improved again in minimizing the impact of the risk of natural disasters.

**Keywords:** Food security, natural disaster mitigation, Mapping, agricultural land

## 1. Introduction

Food security is a very complex issue in agricultural development. Food security is multidimensional, so an assessment of the food security situation requires a comprehensive measure involving a series of indicators (Wineman, 2016; Satapathy *et al.* 2020). These indicators are combined to produce a food security composite value, which is then used as a Food Security Index (Ikeet *et al.* 2017). Food security is a top priority for every country, this is because food is the most basic need for humans (World Health Organization, 2018). Therefore, food security information that is accurate, comprehensive, and well ordered can support efforts to prevent and manage food and nutrition insecurity. However, food security is faced with several main problems, including a large

population with a fairly large growth rate, resulting in a continuous increase in demand for food in large numbers (Godfray *et al.*, 2010). In addition, competition for the use of land and water resources continues to increase, causing disruption of food production capacity. On the other hand, there are still people in some areas who experience food insecurity, either due to famine seasons or due to natural disasters. According to Klomp and Hoogezand (2018), natural disasters that occur in a sustainable manner can cause a food security crisis, this is because the production of agricultural products is not optimal. In addition, natural disasters have an impact on the socio-economic sustainability of a country (Kalfin *et al.*, 2020).

Natural disasters that occurred in Banten Province, especially in Serang Regency, were

Tsunami, landslides, floods, drought, earthquakes and tornadoes. This disaster can result in damage to buildings and agricultural land which has an impact on economic losses and land damage (Klomp and Hoogezand, 2018; Panwar and Sen, 2019). So that the risks caused by disasters have an impact on the agricultural sector, especially the paddy sector. Lesket *et al.*, (2016) stated that several natural disasters that occurred in an area such as extreme weather had damaged part or all of the agricultural production of the area. Natural disasters that occur have caused food instability, due to crop failure, decreased agricultural production. As a result, food production and distribution capacity is limited so that food needs cannot be met (Reddy *et al.*, 2016; Yudha *et al.*, 2020). Therefore, the local government is required to make an appropriate mitigation policy to minimize the risk of natural disasters (Haen, and Hemrich, 2007). This is necessary as an effort to prevent food and nutrition insecurity in Serang Regency. One of the efforts that can be done is to create a map of food security and vulnerability in Serang Regency. It is hoped that this can be used as a basis for program intervention so that it is more focused and on target.

Research on natural disasters and food security has attracted a lot of attention by researchers. For example, research conducted by Umar *et al.* (2017), determine the concept of a food supply chain that is suitable for natural disasters. In determining the optimal food supply chain, logistics, collaboration, sources and knowledge management are needed. With this concept, it can provide food supply security against natural disasters. In addition, in the research of Guo *et al.* (2019), analyzed food security strategies against natural disasters in the highlands of China. The analysis shows that the natural disasters that have occurred in China have greatly affected grain production in recent years. Where it was found that eight provinces in China, namely Heilongjiang, Shandong, Henan, Hebei, Anhui, Sichuan, Jiangsu, Hunan, and

Hubei experienced the most severe decline in grain production. So that efforts are needed to develop existing disaster prevention and mitigation policies. This is necessary as an effort to improve China's food security. In addition, with the current state of the COVID-19 pandemic, food security in each country is experiencing significant disruption. This is confirmed by research conducted by Wanget *et al.* (2020), where in his research determining the scale of food reserves during the COVID-19 pandemic in China. Based on the pandemic situation that occurred in China, local governments need to provide sufficient food reserves. Since the COVID-19 pandemic that occurred in China has had a major impact on food availability, it is necessary to predict changes in food demand and better understand consumer preferences in an emergency. This is also in accordance with research conducted by Pereira and Oliveira (2020), from the results of the research that the COVID-19 pandemic has an impact on food insecurity and nutrition in every country. Therefore, it is necessary to play the role of the government in presenting possible strategies and effective actions to increase food security.

Based on the description above, this research is interested in making a food security mapping based on natural disaster mitigation in Serang Regency, Banten Province, Indonesia. Mapping was carried out based on cases of natural disasters and food security that have occurred in Serang District. In addition, this study will analyze government policies in an effort to minimize the risk of food vulnerability as a result of natural disasters. In addition, this research can be a reference for the local government in its efforts to determine effective natural disaster mitigation in increasing food security in Serang Regency.

## 1. Materials and Methods

### 1.1. Study Areas and Research Data

The location in this study is located in Serang Regency, Banten Province, Indonesia. Serang

Regency has 29 sub-districts, namely Anyar, Badung, Baros, Binuang, Bojonegara, Carenang, Cikande, Cikeusal, Cinangka, Ciomas, Ciruas, Gunungsari, Jawilan, Kibin, Kopo, Kragilan, Kramatwatu, Mancak, Pabuaran, Padarincang, Pamarayan districts. Lightning, Pontang, Pula Ampel, Tanara, Tirtayasa, Tunjung Teja, Lebak Wangi and Waringin Kurung. The location was determined because Serang Regency is one of the areas in Indonesia which is prone to natural disasters, especially drought, landslides, floods and tsunamis as well as research on food management for disaster management has never been carried out. These considerations make this research important for preparing regions to plan food supply for disaster preparedness and mitigation-based disaster management as well as food distribution mechanisms during disaster emergency response. In addition, this study uses primary and secondary data obtained from the Central Statistics Agency of Serang Regency, the Food Security Agency of the Serang Regency Office.

## 1.2. Methods

The design method used in this research is a mix method with quantitative and qualitative approaches. Mix method is a research approach that combines or combines qualitative and quantitative forms. According to Saleet *al.* (2002), mix method research is a combination of quantitative and qualitative research methods. The combination or combination of quantitative and qualitative research methods is used together in a study to obtain more comprehensive, valid, reliable and objective data. According to Park (2016), quantitative research methods can be interpreted as research methods based on the philosophy of positivism, used to research on certain populations or samples, sampling techniques are generally carried out randomly, data collection uses research instruments, data analysis is quantitative with the aim to test the hypothesis that has been set. While the qualitative research method is called a new method which is based on the philosophy of postpositivism as an

interpretive method because the data from the research results are more concerned with the interpretation of the data found in the field. Descriptive understanding is a method that describes or provides an overview of the object under study through collected data or samples (Bryman *et al.*, 2008).

## 2. Results and Discussion

Food security is a reflection of the availability of sufficient, nutritious and even food that can be accessed by each individual so that its absorption can be maximized for the sake of achieving a healthy and productive life. National food security is the country's ability to produce adequate amounts of food for all consumers at affordable prices (Kneafsey *et al.*, 2013). The food insecurity and vulnerability assessment in Serang District considers three main variables; availability, dependence and utilization of food. Each variable is mapped and analyzed spatially to obtain a comprehensive picture of existing food security. Working variables are analyzed in stages starting from each single indicator where the ratio value is calculated and reclassified at uniform intervals. Then each value is classified back into priority to be calculated in a composite.

### 3.1 Food availability

The majority of foodstuffs produced or imported from outside the region must enter the market first before reaching households. Therefore, in addition to food production capacity, the existence of food supply facilities and infrastructure such as markets will be closely related to food availability in an area, to describe the situation of food availability in a district, the indicator can use the ratio of the number of facilities and infrastructure providing food to the number of households (Faber *et al.*, 2009).

The food availability variable is reflected in the number of food stalls, grocery stores and restaurants. Based on data compiled from the Central Bureau of Statistics in 2020, it was found that not all of the indicator values were complete in every village and sub-district

unit. So that the resulting value does not fully represent the actual value in the field. The number of restaurants, grocery stores and restaurants is totaled and fixed by the population for each village unit. The value of the food availability ratio ranges from 0 to 2.35. These

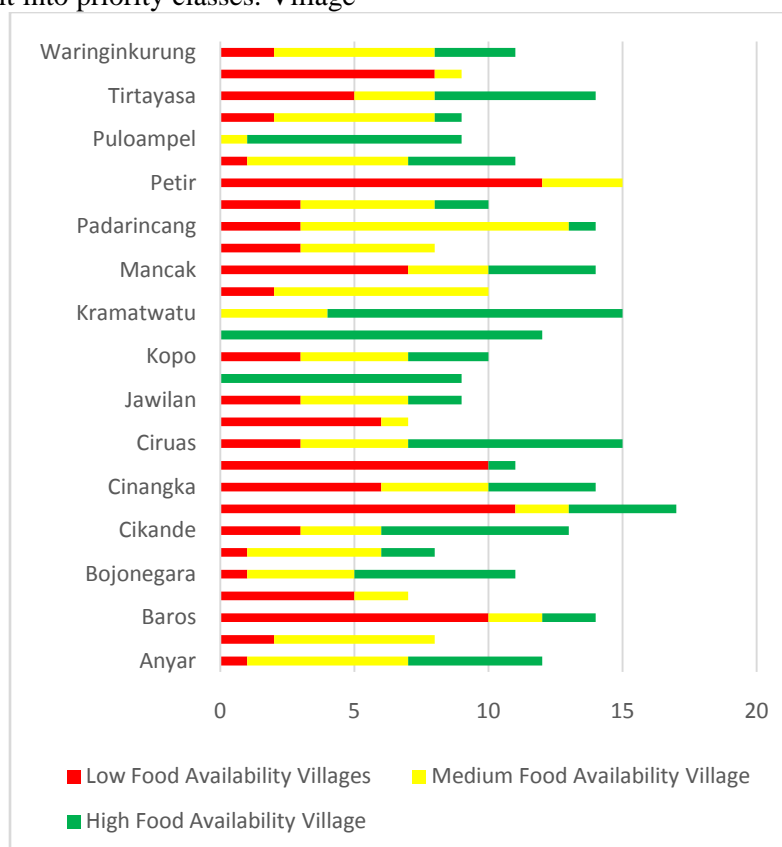
values are divided into priority classes with the same ranges as shown in the following table:

**Table 1.** Food Availability Indicator Ratio Value Class

Value range	Class	Level
0 – 0.12	Priority 1	Low
0.12 – 0.29	Priority 2	Moderate
0.29 – 2.35	Priority 3	High

The range of food availability ratio values is used as the basis for dividing each existing village unit into priority classes. Village

data based on priority class of food availability is presented in the diagram in Figure 1 below.



**Figure 1.** Village data based on priority class of food availability

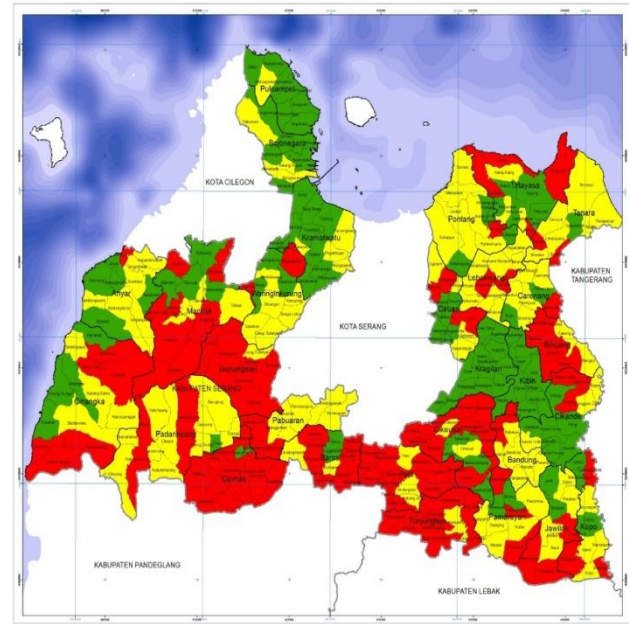
Based on Figure 1, the data shows that as many as 326 villages in Serang District, 112 villages are included in priority class 1, where these villages need more food supply outlets. In addition, there are 108 villages and 106 villages that are included in priority class 2 and 3.

Overall, there tend to be more villages with low food availability compared to other classes. Based on the results of research by Prasada, *et al.* (2019) regarding the difference and influence of food security indicators on the proportion of BBLR in the coastal areas of Java Island, namely Bangkalan Regency and Tulungagung



Regency, shows that Bangkalan Regency is a district with development priority areas, an indicator of store ratios that has a high effect and can describe the availability of sufficient food for consumption. Based on reports from the Central Statistics Agency of Serang Regency, grocery stores, food stores and restaurants have increased every year, so that the availability of food sold by supply shops can meet the needs of the people in Serang Regency. According to Suryahadiet *al.* (2018) the value of the sustainability index for the availability of rice in Pandeglang Regency, Banten Province is 51.88 with a fairly sustainable category status.

Spatially, the distribution of villages with food availability is presented in Figure 2. Based on the analysis map, it can be seen that the distribution of villages with high ratios of food stalls, grocery stores and restaurants is associated with roads, especially major roads such as Cikande, Kibin, Ciruas, Kramatwatu and Bojonegara Districts. The closer to the road, the lower the ratio value. The influencing factor is the relatively high population around the roads. However, the resulting value is less relevant because the number of facilities is not recorded properly based on the source data obtained. Based on the food availability mapping shown in Figure 2, villages with food security are shown in green and villages with sufficient food availability are shown in yellow. Whereas villages that are very vulnerable to food availability are given in red. The map of food availability in Serang Regency depicts areas that provide goods for consumption by the community, based on the results of data that have been obtained by several districts, showing that there is still a lack of places to provide foodstuffs. Areas in red indicate that the region is in the vulnerable or low category. This is because the availability of food supply stores, such as grocery stores, restaurants and others, is still inadequate.



**Figure 2.** Map of Availability Ratio of Food Stalls, Grocery Stores and Restaurants

### 3.2 Food security

Food security is the most important part in fulfilling the right to food as well as one of the main pillars of human rights. Food security is also the most important part of national security. The unequal distribution of food becomes an obstacle to realizing food security at the national level. This phenomenon explains the hunger paradox, a concept used to explain a phenomenon where national food security has matured. According to Sari and Munajat (2020), the level of national food security includes the provision of food in quantity and quality at affordable prices for the community, especially in rural areas. In general, food security is defined as a condition in which everyone has physical and economic accessibility to sufficient food to meet food needs in order to live a productive and healthy life, however, based on Government Regulation Number 17 of 2015 concerning food security is a condition in which the fulfillment of food for the state to individuals, which can be reflected in the availability of sufficient food, in the form of quantity and quality, safe, varied, nutritious, equitable and affordable and does not conflict with the beliefs and culture of the community.

Analysis of each existing indicator map produces a tentative map of food security. Each priority class in an indicator is reviewed. Furthermore, the score is calculated by weighted addition with a uniform weight between each indicator (availability, affordability and utilization of food). The range of the calculated composite score values ranges from 0 to 5.00. These values are further divided into five priority classes as presented in Table 26 below.

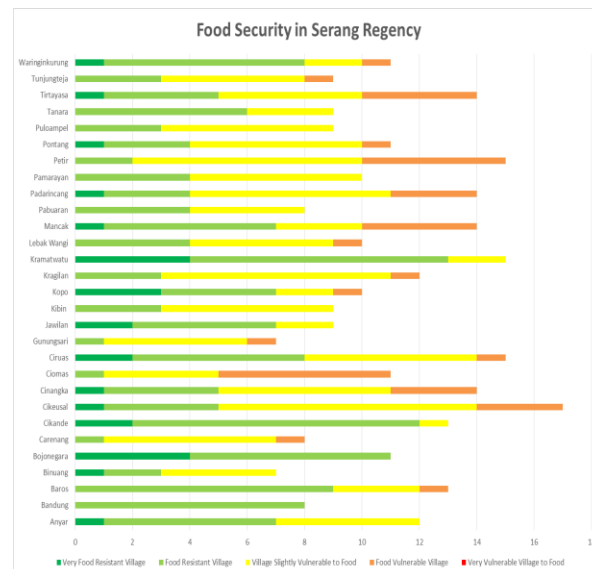
**Table 2.** Value Class of Food Security Composite Score

Rentang nilai	Kelas	Tingkat
0 – 0.5	Priority 1	Very Vulnerable to Food
0.5 – 1	Priority 2	Vulnerable to Food
1 – 2.5	Priority 3	Slightly Food Vulnerable
2.5 – 4.8	Priority 4	Hold Food
4.8 – 5.00	Priority5	Very Food Resistant

Priority class 1 describes a high level of food insecurity, which means that there is poor food security. The opposite is true for larger priority classes, for example Priority 5 classes. Villages that fall into this class are considered to have good food security and are not prone to food shortages. Based on the analysis conducted, information on food security in Serang Regency was obtained. The dominating food security priority class is priority 3, which is 136 villages. This shows that food insecurity in Serang Regency is relatively moderate. Apart from this fact, there are 6 villages that fall into priority 1 class in Cinangka, Ciomas, Petir, Tirtayasa and Waringinkurung Districts. Meanwhile, priority class 2 has 40 villages, almost all of which are scattered in each sub-district. The two priority classes are the main ones to be addressed in relation to existing food security. In general, the following figure presents a recapitulation of the

number of villages with food insecurity for each existing priority class.

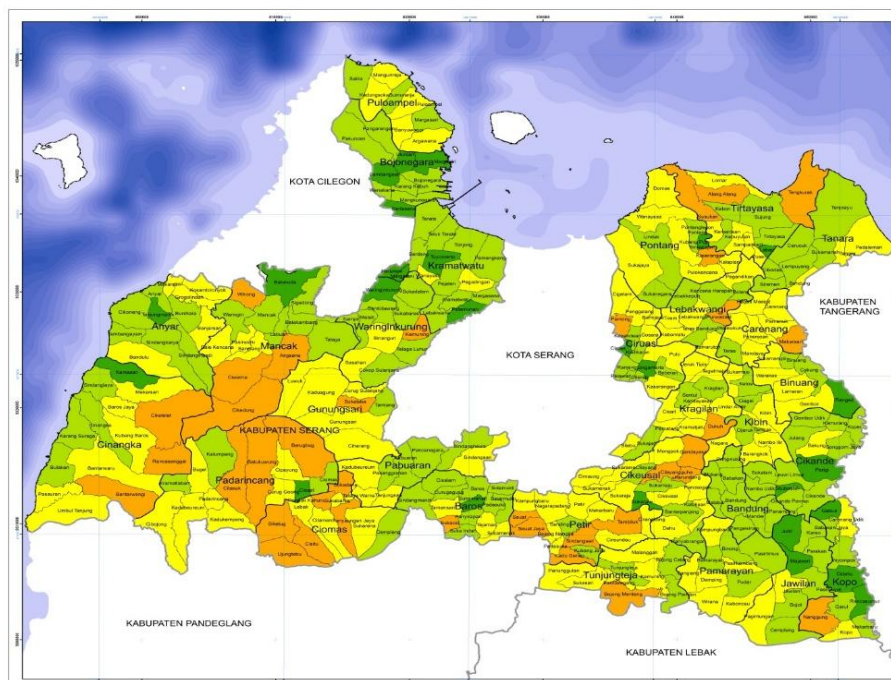
Based on the results of research by Brito and Borelli (2020), as a whole, the majority of the Brazilian State UFMB does not consider the



results of food production in cities. The municipalities in these areas have sufficient food security. Meanwhile, in Serang Regency, consumption needs still rely on farmers' products, so that currently the community's food needs are still adequate.

**Figure 3.** Village Resilience Levels in Serang District

The distribution of each village priority class is presented in Figure 3. The trend of villages with priority class 1 and 2 is in the sub-districts associated with hills such as Ciomas, Padarincang, Gunungsari, Mancak and Cinangka. In addition, the villages in Tanara Tirtayasa and Pontang Districts also showed the same priority class trends. If analyzed further, the pattern is closer to the priority class based on the level of food affordability. This becomes the basis for drawing the conclusion that the most associated factor is the existence of food accessibility.



**Figure 4.** Food Security Map of Serang Regency

A series of analyzes conducted resulted in information on food security and insecurity in Serang District. In general, Serang Regency has a moderate trend of food security where there are 136 villages (42%) with priority class 3, 116 villages (35%) on priority 4 and 28 villages (9%) on priority 5. Villages with food insecurity are becoming The first priority is 5 villages (2%) and priority 2 is 40 villages (12%). The factors that influence food security are food affordability, where the low accessibility indicator has a close spatial association with priority classes 1 and 2.

### ***3.3 Impact of Disaster on Food Security in Serang District***

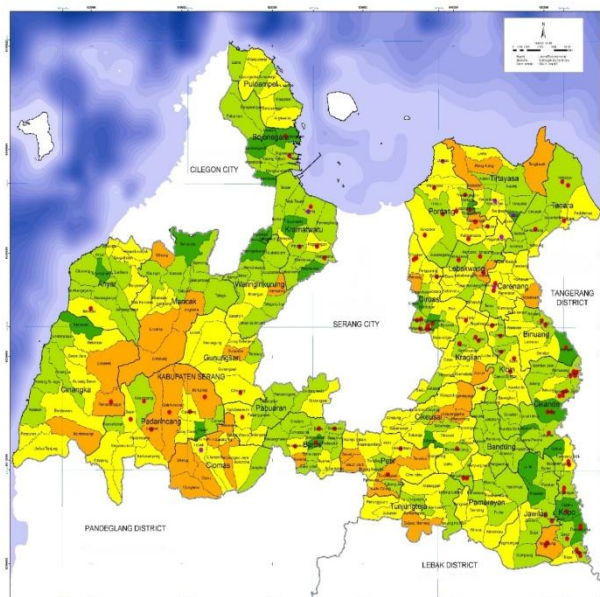
In general, the impact of a disaster can be direct or indirect. Direct impacts are relatively more predictable than indirect impacts. The impact experienced by urban areas which are dominated by residential areas is also different from the impacts experienced by rural areas which are dominated by agricultural areas. Natural disasters are a threat to the government, because they hamper food development in areas, where

natural disasters are events that can occur suddenly, thus disturbing community activists (Israel and Briones, 2012). Indonesia is located in a tropical climate with two seasons, namely hot and rainy, characterized by changes in weather, temperature and wind direction which are quite extreme. There are many disaster-prone areas in Indonesia, so disaster risk reduction efforts are needed. When there is a disaster, there are organizations that try to take their best actions without any coordination with other organizations, causing conflicts between organizations. However, conflicts can also be caused by the different abilities of each organization or individual who wants to cooperate, causing mutual distrust. This is the task of the government, but it is carried out jointly and in collaboration with related agencies.

Based on the results of the analysis of flood and drought disasters in Serang Regency, one of the impacts on community agricultural land. However, when viewed from the food security in Serang Regency, it is still classified as safe.



The following map overlay disaster with food security is presented in Figure 5.



**Figure 5.** Overlay Map of Disaster with Food Security in Serang District

Based on Figure 5, during 2020, flood disasters occurred in several sub-districts in Serang Regency which were marked with red dots and purple colors, which were drought events. Based on the data obtained, there were 47 floods in several sub-districts in Serang Regency, while the drought was 14 times. The impact of the disaster that occurred caused damage to land in the food sector. Following are details of flood and drought disasters in Serang Regency are presented in Table 3 below.

**Table 3.** Data on Disasters with Food Security in Serang District

Type of Disaster	Disaster in Very Food Vulnerable Village Locations	Disaster in Food Vulnerable Village Locations	Disaster in Village Locations Slightly Vulnerable to Food	Disaster in Food Resistant Village Locations	Disaster in Very Food Resistant Village Locations
<b>1.Flood</b>	-	- Village Rancasanggal (Districts Cinangka)	- Village Pegadingan (Districts Kramatwatu)	- Village Bojonegara (Districts Bojonegara)	- Village Maragagiri (Districts Bojonegara)
<b>Information:</b>		- Village Citasuk (Districts Padarincang)	- Village Bandulu (Districts Anyar)	- Village Tonjong (Districts Kramatwatu)	- Village Sukamanah (Districts Baros)
●● : There are 2 floods occurring in 1 village	-	- Village Batukuwung (Districts Padarincang)	- Village Bugel (Districts Padarincang)	- Village Pejaten (Districts Kramatwatu)	- Village Singarajan (Districts Pontang)
●●● : There are 3 floods occurring in 1 village	-	- Village Barugbug (Districts Padarincang)	- Village Cipayung (Districts Padarincang)	- Village Margasana (Districts Kramatwatu)	- Village Singamerta (Districts Ciruas)
●●●● : There are 4 floods occurring in 1 village	-	- Village Sindangsari (Districts Petir)	- Village Ciherang (Districts Gunungsari)	- Village Kalumpang (Districts Padarincang)	- Village Renged (Districts Binuang)
	-	- Village	- Village Kadubeureum	- Village	- Village



Type of Disaster	Disaster in Very Food Vulnerable Village Locations	Disaster in Food Vulnerable Village Locations	Disaster in Village Locations Slightly Vulnerable to Food	Disaster in Food Resistant Village Locations	Disaster in Very Food Resistant Village Locations
		Kaserangan ( Districts Pontang) - Village Purwadadi (Districts Lebakwangi) - Village Nanggung (Districts Kopo) ●●	(Districts Pabuaran) - Village Tamansari (Districts Baros) - Village Mekarbaru (Districts Petir) - Village Tanara (Districts Tanara) - Village Wanayasa (Districts Pontang) - Village Sukajaya (Districts Pontang) - Village Kubang Puji (Districts Pontang) - Village Pulokencana (Districts Pontang) - Village Cigelam (Districts Ciruas) ●● - Village Bumijaya (Districts Ciruas) - Village Walikukun (Districts Carenang) - Village Jeruktipis (Districts Kragilan) - Village Sukamaju (Districts Kibin) - Village Kibin (Districts	Baros (Districts Baros) - Village Sidamukti (Districts Baros) - Village Tenjoayu (Districts Tanara) ●● - Village Lempuyang (Districts Tanara) - Village Linduk (Districts Pontang) - Village Pontang (Districts Pontang) - Village Lebak Kepuh (Districts Lebakwangi) - Village Kencana Harapan (Districts Lebakwangi) - Village Ranjeng (Districts Ciruas) ●● - Village Pelawad (Districts Ciruas) - Village Citerep (Districts Ciruas) ●●● - Village Sentul (Districts Kragilan) - Village Kragilan (Districts	Parigi (Districts Cikande) ●● - Village Cidahu (Districts Kopo) - Village Rancasumur (Districts Kopo) ●●

Type of Disaster	Disaster in Very Food Vulnerable Village Locations	Disaster in Food Vulnerable Village Locations	Disaster in Village Locations Slightly Vulnerable to Food	Disaster in Food Resistant Village Locations	Disaster in Very Food Resistant Village Locations
			Kibin)	Kragilan) ●●	
			- Village	- Village	
			Tambak	Cakung	
			(Districts	(Districts	
			Kibin)	Binuang) ●●	
			- Village	- Village	
			Nagara	Cikande	
			(Districts	(Districts	
			Kibin)	Cikande)	
			- Village	- Village	
			Carengudik	Songgomjaya	
			(Districts	(Districts	
			Kopo) ●●	Cikande)	
				●●●●	
				- Village	
				Koper	
				(Districts	
				Cikande)	
				●●●●	
				- Village	
				Ketos	
				(Districts	
				Kibin)	
				- Village	
				Ciragel	
				(Districts	
				Kibin)	
				- Village	
				Bantar	
				Panjang	
				(Districts	
				Cikeusal)	
				- Village	
				Panyabrangan	
				(Districts	
				Cikeusal) ●●	
				- Village	
				Nyompok	
				(Districts	
				Kopo) ●●	
				- Village Garut	
				(Districts	
				Kopo)	
				- Village	
				Mekarbaru	
				(Districts	
				Kopo) ●●●	
				- Village	
				Pasirbuyut	
				(Districts	
				Jawilan) ●●	

Type of Disaster	Disaster in Very Food Vulnerable Village Locations	Disaster in Food Vulnerable Village Locations	Disaster in Village Locations Slightly Vulnerable to Food	Disaster in Food Resistant Village Locations	Disaster in Very Food Resistant Village Locations
2. Dryness		- Village Barugbug (Districts Padarincang)	- Village Baros jaya (Districts Cinangka) - Village Kubangbaros (Districts Cinangka) - Village Kadukempong (Districts Padarincang) - Village Lebak (Districts Ciomas) - Village Domas (Districts Pontang) - Village Sukajaya (Districts Pontang) - Village Kebuyutan (Districts Tirtayasa) - Village Padaleman (Districts Tanara) - Village Walikun (Districts Carenang)	- Village Tonjong (Districts Kramatwatu) - Village Tenjoayu (Districts Tanara)	- Village Laban (Districts Tirtayasa)

Based on Table 3. Several areas with food range status experienced floods, such as in Village Rancasanggal, Cinangka District. Village Citasuk (Padarincang District), Village Batukuwung Padarincang District, Village Barugbug Padarincang District, Village Sindangsari Petir District, Kaserang Village Pontang District, Purwadadi Village Lebakwangi District and Nanggung Village Kopo District. The flood disasters that occurred in several villages had an impact on agricultural production, especially in the rice commodity, so

that the status of food security also decreased. According to Sianturiet *al.*, (2018), the results of their research on the impact of flooding on rice fields, the results of the study show that the potential for flooding has a high impact on agricultural land.

Flood disasters occur mostly in village locations with a slightly food insecure status and villages with food resistant status, there are also several villages that experience 1,2,3 and 4 points of flood events in one village, but the impact of these disasters has no effect on the level of availability status. Food, when viewed from the

majority of rice productivity in the sub-district in Serang Regency has increased and has rice reserves for consumption, so that the flood disaster does not cause a change in the status of food security in disaster-hit villages. Flood disasters also occurred in areas with very food resistant village status, the disaster did not cause minor damage, and there were 8 villages in Serang Regency where floods were very food resistant.

The flood disaster mitigation strategy has been implemented by the Disaster Management Agency in Serang District. It is hoped that early mitigation implementation can minimize the impact on agricultural land, so that food security in the district can increase. According to the views of McConnell and Viña (2018), if the trend of development and people's behavior towards the environment is still as it is today then floods and other disasters, which are caused by human activities, will more often occur in many areas with higher intensity and impact getting bigger and wider. Many flood control programs have been implemented but floods (frequency, duration, intensity, inundation area) continue to increase. Changes in spatial planning or land use have more influence or contribution to the occurrence of flooding than the physical construction of flood control (O'Connell *et al.*, 2007). Regional and city spatial planning as well as collaborative efforts of various parties and regions are expected to contribute to flood disaster management, especially in minimizing the possibility of negative impacts that occur and taking advantage of the potential and opportunities available in flood disaster areas while still paying attention to the conditions of the local community.

The occurrence of drought disasters occurred in several locations in food range villages, food retain villages, food vulnerable villages and very food resistant villages. The average occurrence of drought disasters occurs in areas with little food resistance. The impact of the drought on food security in Serang Regency has the potential to produce food crops, with the

occurrence of drought, agricultural products have decreased. The management plan has been implemented by the Disaster Management Agency in Serang Regency, thus minimizing the impact of a drought. According to research by Mursidi and Sari (2017). Droughts have broad and complex impacts that last long after they have ended. This extensive impact that lasts for so long is due to the fact that water is a basic and vital need for every living being, irreplaceable by other resources. The impacts in agriculture include limited irrigation water, reduced planting area, decreased land productivity, decreased crop production, and reduced farmer income, and from a social perspective, drought can lead to widespread divisions and conflicts including conflicts between water users and even between governments local (Wilhelmi and Wilhite, 2002). According to Rigby *et al.*, (2011) the drought disaster will be able to delay the demographic bonus that should have been achieved and has worried many far-sighted parties. Human progress that is expressed in the success of mastering nature has been presented.

Based on data from the National Disaster Management Agency, Demak Regency is less prone to agricultural drought. Areas that fall into the very vulnerable category are Bonang District, Karang Tengah District, W Gedung District and Demak District. Bonang, Karangtenah and Wentuk sub-districts, where the majority of land use is directed towards fisheries such as ponds and fishermen or apart from fisheries there are also mangrove forests. In addition, it is also due to the type of soil that has a very low water absorption, namely gromosol, plus low rainfall. According to the view of Gerber and Mirzabaev (2017) the costs of action against drought are classified into three categories: costs of preparedness, costs of drought risk mitigation and relief costs of drought.

### 3. Conclusion

Natural disasters that occur have an impact directly or indirectly on food availability and



security in Serang Regency. However, the natural disaster management efforts carried out in Serang Regency have been running effectively. This is indicated by the availability of food that continues to increase, as indicated by the existence of grocery stores, food stores and restaurants every year that continues to increase. In addition, it is indicated by the average food availability in each district that is in the safe category. In general, Serang Regency has a moderate trend of food security, where there are 136 villages (42%) with a slight level of Food Vulnerability, 116 villages (35%) at the Food Resistant level and 28 villages (9%) at the Very Food Resistant level. Villages with food insecurity are the first priority (Very Vulnerable to Food), namely 5 villages (2%) and 40 villages (12%) at the Food Vulnerability level. The factors that affect food security are food affordability where the indicators of accessibility are low. The implementation of early mitigation by the government can minimize the impact on agricultural land, so that food security in the district can increase. However, with the current trend of development and community behavior towards the environment, floods and other disasters, which are caused by human activities, will occur more frequently in many areas with higher intensity and larger and wider impacts. Therefore, Regional and City spatial planning is needed as well as cooperation efforts of various parties and regions in order to contribute to flood disaster management, in particular minimizing the possibility of negative impacts that occur and taking advantage of the potential and opportunities available in flood disaster areas while still paying attention to food security conditions..

#### 4. References

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