

The Disaster Impacts on Children Welfare in West Java Province, Indonesia

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Abstract

Children are one of the groups exposed to the impact of natural disasters. Natural disasters can cause fatalities and injuries in children, as well as disruption of teaching and learning activities. Natural disasters can mainly affect children under the age of growth 'golden age', aged 0 to 5 years. At the time of this rapid growth, interference or obstacles that occur in long-term growth can result into adulthood. Interference or obstacles that may occur during this growth may be due to hunger, malnutrition, stress and diseases that occur due to natural disasters. The impact of this natural disaster has been felt by most of the children in Indonesia, which is a country with a high risk of natural disasters. In fact, children are the future generation who will determine the well-being of the country's competitiveness. In addition, children are the largest population in the country. Unfortunately, studies that measure the impact of natural disasters on children in Indonesia are still few. Therefore, this study has a high urgency and immediate, to fill in the gaps of knowledge in terms of the impact of disasters on children, as one of the vulnerable groups. This research study location is in West Java with a case study in Bandung regency and Garut. West Java itself has experienced catastrophic impact of the earthquake, flood and drought. Bandung Regency also has high levels of economic growth and high population, which will trigger the vulnerability of the population, including children. Thus, from this research the disaster impact on children well-being will be mapped out.

Keywords: Children; Disaster Impact; Vulnerability

Abstrak

Anak-anak merupakan salah satu kelompok yang terpapar terhadap dampak bencana alam. Bencana alam dapat menyebabkan korban jiwa dan luka-luka pada anak-anak, maupun terganggunya kegiatan belajar mengajar. Bencana alam terutama dapat mempengaruhi anak-anak dalam usia pertumbuhan 'golden age' yakni usia 0 sampai 5 tahun. Pada masa pertumbuhan yang sangat pesat ini, gangguan atau hambatan yang terjadi pada pertumbuhan dapat berakibat jangka panjang hingga usia dewasa. Gangguan atau hambatan yang dapat terjadi pada masa pertumbuhan ini dapat dikarenakan kelaparan, kekurangan gizi, stres dan penyakit yang terjadi karena bencana alam. Dampak bencana alam ini telah dirasakan oleh sebagian anak-anak di Indonesia, yang merupakan negara dengan risiko bencana alam yang tinggi. Padahal anak-anak merupakan generasi penerus

bangsa yang kesejahteraannya akan menentukan daya saing dari negara tersebut. Ditambah lagi, anak-anak termasuk pembentuk populasi terbesar yang ada dalam suatu negara. Sayangnya penelitian yang mengukur dampak bencana alam terhadap anak-anak di Indonesia belum banyak dilakukan. Karena itu, penelitian ini memiliki urgensi yang tinggi dan bersifat segera, untuk mengisi kekosongan pengetahuan di dalam hal dampak bencana terhadap anak-anak, sebagai salah satu kelompok rentan. Penelitian ini diusulkan di Jawa Barat dengan studi kasus di Kabupaten Bandung dan Garut mengingat kabupaten ini mengalami dampak bencana yang besar dari sisi gempa bumi, banjir dan kekeringan. Kabupaten Bandung dan Garut juga memiliki tingkat pertumbuhan penduduk dan ekonomi yang tinggi, yang akan memicu kerentanan penduduk termasuk anak-anak. Adapun tujuan dari riset ini adalah menganalisis dampak bencana terhadap anak-anak dengan studi kasus di Jawa Barat.

Kata Kunci: anak-anak, dampak bencana, kerentanan

1. Introduction

Disaster gives various impacts to a community, in terms of physical, psychological, economic and material. Natural disasters will cause casualties and damage, be it fatalities, injuries, damage to private and public facilities, as well as induces refugees who are generally susceptible to the disease. It impacts the whole community, particularly the vulnerable groups such as elderly, disables and children. Disaster will leave the community in Conditions of communities around the affected area after the disaster will usually be in paralyze state due to the infrastructure damage or possession loss that the people suffer. Many diseases could break out among refugees include diarrhea, respiratory infections, measles, and malaria, which are identified by WHO as 'The Big Four' (Ferry and Makhfudli, 2009).

Children and young people represent 30 percent of the world population, making them as the largest group of people currently affected by natural disasters. Children also have a higher susceptibility than adults. This is because the children are in the process of physical development and cognitive, so physically and mentally, they have a lower capacity to handle the consequences caused by climate change and disasters, such as food shortages, loss or stress so that the risk of such exposure is more have a long-term impact on the life of the child.

Further research is needed to understand how natural disasters affect children in many different areas. This understanding needs to be obtained in order to reduce the negative impact of natural disasters on children, and to empower kids to respond to the challenges of natural disasters at all levels. Therefore, this study is aiming to analyze the impact of natural disasters on children with a case study in West Java. Through this study the key problems, needs, and trends of disaster impacts towards children are being assessed.

The location to be analyzed in this paper is West Java. West Java Province became the focus because most of the area potentially vulnerable to natural disasters. The capital of West Java, Bandung City, experienced tremendous development in the last decade (2005-2015), particularly after the opening of new toll road from Jakarta to Bandung (Tarigan et al, 2016) From 26 regencies / cities in West

Java, as many as 17 districts / municipalities potentially prone to natural disasters, both landslides, floods and earthquakes (Figure 1). For example, in 2008, noted the existence of various catastrophic events, namely: fire as much as 43 times, 51 times floods, landslides 68 times, hurricanes and earthquakes 74 times 7 times. In this study, will be assessed an outline of the impact of disasters on districts in West Java.

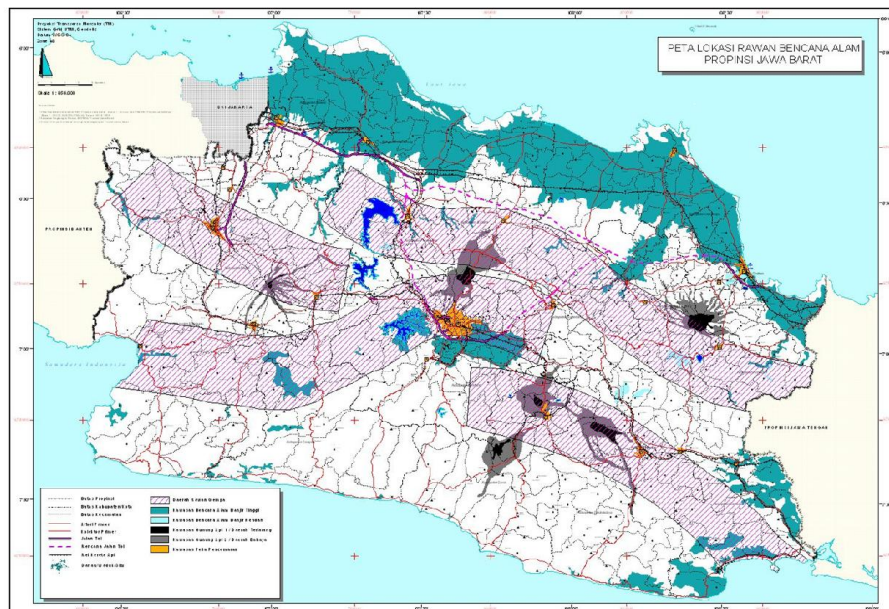


Figure 1. Disaster Vulnerable Area in West Java
Source: Sadisun, 2007

2. Literature Review

2.1 Disaster impact in Indonesia

Disease. In Indonesia, the impact of natural disasters is felt prominently from flooding. For example is the massive floodings which occurred in some areas in Indonesia in 2008. In these events, the refugees' health were deteriorated due to exposure to germs, poor quality of environmental and decreased of body's immunity. The Association of Indonesian Internal Medicine Medical Relief assessed the 51 flood points in Jakarta that impacted 3000 people and reported that the diseases suffered by most of the people were diarrhea, acute respiratory infection, leptospirosis and skin diseases. To note, diarrhea suffered in the long term can lead to malnutrition and increased susceptibility to other diseases. Moreover, the Ministry of Health data show, that diarrhea has become the second killer disease of children under five years of age or under five in Indonesia, after pneumonia. The incidence of respiratory infection is also increasing every year¹.

Malnutrition. Globally, malnutrition is currently causing the death of 3.1 million children under 5 each year, nearly half (45%) of all deaths in this group (The Lancet 2013). In addition, malnutrition is the cause of the stunted of the 26% of children in the world under the age of 5 years (UNICEF, 2013). In a society, children under five are most vulnerable to malnutrition.

¹ In 2011, the respiratory infection patient reaches 18.790.481 people with another 756.577 people suffering from pneumonia, which is a steep increase of acute respiratory infection as much 18.069.360 million people in 2010.

In Indonesia, based on data from the Ministry of Health, the incidence of malnutrition and malnutrition in children under five in 2002, respectively 8% and 27.3%. In 2003 the incidence of malnutrition has increased, respectively to 8.3% and 27.5%. 2005 rose again to respectively 8.8% and 28.0%, or approximately 1.8 million (UNICEF, 2011). Of children who suffer from malnutrition are 150,000 suffer from severe levels of malnutrition called marasmus, kwashiorkor and marasmus-kwashiorkor. In 2006 malnutrition increased to 2.3 million. And increased prevalence of malnutrition continue to occur in 2007, where for 116 districts / cities in Indonesia malnutrition in over 40 per cent of the population under five. It can be concluded that malnutrition is increasing every year and spread in almost all provinces in Indonesia.

Violations of the right to education. Children in many cases are forced to skip or drop out of school as a result of school and infrastructure damage or due to the need to help their families recover from the disaster. A review conducted by the World Bank shows that a household income would typically reduce after a disaster event, especially for households who are already poor. Consequently, the household spending is reduced, including the decline in investment in the education of children (Baez J. et al., 2010). In another words, the impact of natural disasters on the livelihoods generally make parents withdraw their children from school during emergencies - and have little possibility to go back to school (Plan, 2013).

2.2 Social vulnerability assessment

Social vulnerability also affects the level of vulnerability to hazards. The DFID Strategy Paper *Halving World Poverty by 2015* (2000) identifies ‘natural disasters’ as one of many threats to achieving the poverty reduction target and states that ‘the vulnerability of poor people to shocks needs to be reduced’ (pp. 14 and 12). It argues that natural disasters are frequent in the poorest countries. The poor are usually hardest hit ‘because they often only have access to low cost assets (for example land or housing) which are more vulnerable to disasters.’ (p.26). moreover, the Strategy Paper states that reducing vulnerability to shocks is one of the three ‘fundamental requirements’ for meeting the poverty reduction target (Figure 2).



Figure 2. Onset of Social Problem²

Cannon et al (2003) summarized that vulnerability is not the same as poverty, marginalization, or other conceptualizations that identify sections of the population who are deemed to be disadvantaged, at risk or in other ways in need. Poverty is a measure of current status: vulnerability should involve a predictive quality: it is supposedly a way of conceptualizing what may happen to an identifiable population under conditions of particular risk and hazards.

² All data of social problem in West Java is derived from a report by Statistical Center of West Java (BPS) with title “West Java in Number 2013”.

In order to understand how people are affected by disasters, it is clearly not enough to understand only the hazards themselves. Instead vulnerability should be taken into consideration. Vulnerability is the term used to describe the condition of people that are at different levels of preparedness, resilience and with varying capacities for recovery. Vulnerability involves much more than the likelihood of being injured or killed by a particular hazard, and includes the type of livelihoods people engage in and the impact of different hazards on them.

It is especially important to recognize this social vulnerability. It is crucially about the characteristics of people, and the differential impacts on people of damage to physical structures. Social vulnerability is the complex set of characteristics that include a person conditions as seen in Table 1.

Table 1. Variables of Social Vulnerability

Indicators	Description
Initial well-being	Nutritional status, physical and mental health, moral
Livelihood and resilience	Asset pattern and capitals, income and exchange options, qualifications
Self-protection	The degree of protection afforded by capability and willingness to build safe home, use safe site
Social protection	Forms of hazard preparedness provided by society more generally, e.g. building codes, mitigation measures, shelters, preparedness
Social and political networks and institutions	Social capital, but also role of institutional environment in setting good conditions for hazard precautions, peoples' rights to express needs and of access to preparedness.

Source: Cannon et. al, 2003

3. Methods

For data analysis, this study relies on mix approaches of quantitative and qualitative analyses based on desk review, graph and matrix, focus group discussions, key informant interviews and questionnaire. Quantitative approaches are from secondary data and small sample questionnaires administered to the FGD participants. Focus group discussions, key informant interviews are analyzed based on content analysis. Furthermore, in order to obtain the desired information about the indicators of climate change adaptation, ~~we conducted key interviews with related institutions. Some NGOs related to children that work in West Java were interviewed, such as Bandung Disaster Study Group (BDSG), Kerlip Foundation, and Semak Foundation.~~ Flow of analysis is presented and shows discussion and analytical flows (Figure 3).

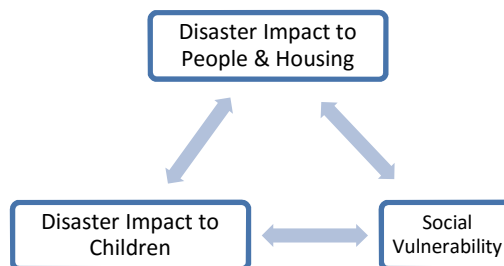


Figure 3. Flow of Analysis

4. Results

In this section, the disaster overview in West Java will be elaborated described to give a comprehensive overview of disaster risk in each *district*.

4.1. Hydrometeorological Hazards in West Java

The following section discusses disaster that happened in West Java Province³.

Floods

West Java region affected by floods caused by at least three main factors, namely because of high rainfall intensity duration than normal resulting in runoff water that exceeds the carrying capacity of the drainage system, changes in land use that are not controlled and geological and morphological conditions of the land. The districts that are most affected by floods in West Java⁴ are **Karawang** (affecting 684.658 people), **Subang** (385.263 people), **Bekasi** (381.485 people), **Indramayu** (162.201 people), Cirebon (DAS Cimanuk and Cipunagara). On the other hand, the districts that have damaged houses due to floods are: Ciamis (12.847 units), Bandung (5.116 units), Sukabumi (2.857 units) and Bandung city (1.860 units). Not only housing, floods also cause tremendous loss in agriculture sectors in Bandung District, which caused crop failures of 2.255 ha per year between 1989-2000. Extreme cases of flood caused crop failure of nearly 13.000 ha.

On the other hand, there is another type of flood that have caused considerable damaged in West Java, that is **flash flood**. Flash flood occurred mostly in southern region of West Java, among others, in **Garut**, Banjar, and Sukabumi District, and includes a region of small scattered in the northern part of West Java. Flash flood took place when the rain falls with high intensity and in a long period of time, which caused the volume of river water to increase. Eventually, the stream of the river could break the weir or barrage of the river, causing flash floods. The districts that are impacted most by flash flood are those in following districts: Bandung (76.058 people), Bogor (9.056 people), Cianjur (6.289 people) and Garut (4.255 people). On the other hand, the district suffered houses damaged by landslide within the period of 1815-2014 are Cianjur (2.857 units), Bogor (2.479 units), Bandung (872 units) and Garut (574 units). Considerably, there is an increasing flood events due to bad drainage in urban areas of West Java. For example, water inundation after raining occurs very frequently in Bandung City (Rianawati and Sagala).

Landslides

Based on data from the Directorate of Volcanology and Geological Hazard Mitigation in 2005, in West Java landslide occurred 24 times, among others in the district of **Bandung**, **Garut**, Sukabumi, and Tasikmalaya. In general, landslides triggered by high intensity of rainfall, in addition to the

³ The data was summarized from BNPB website (http://dibi.bnpb.go.id/DesInventar/simple_data.jsp). The period of data used is from 1815-2014. The number of impacted people was the total number of casualties, those who were missing, injured, suffered or evacuated. The number of damaged infrastructure was the total number of houses heavily and midly damaged, damaged health facilities and damaged school facilities or else stated otherwise. In the section of "drought", the data used is impacted land which measures in hectares (ha).

⁴ The north coast of West Java is a disaster-prone area tidal flooding / rob. This is due to the high sedimentation on the beach so that when the tide comes, the sea water would inundate the low-lying coastal regions. In addition, river water or water from the sewer cannot flow into the ocean because during high tide, the sea level is higher than the water level in the ground.

condition of the land slope is quite steep and are not covered by vegetation or soil and rock properties are quite sensitive to flooded conditions.

In term of population impacted by landslides, **Bandung** (79.153 people), Bogor (11.394 people), Cianjur (8.358 people) and Garut District (4.828 people) are among the largest landslide victims in West Java. Whereas regencies that suffered damaged of infrastructure are Bogor (413 units), Cianjur (273 units) and Ciamis (192 units). In term of impacts to built environment, such as public facilities (education and health), and destroyed houses, Bogor and Cianjur District suffer the most number of impacts.

Strong winds

The incidence of strong winds is becoming more prevalent over the years due to climate change. Not only the frequency has increased, the speed and damaged caused by the strong winds has also increased. One of the most affected districts in 2008 is Bandung district, where five villages

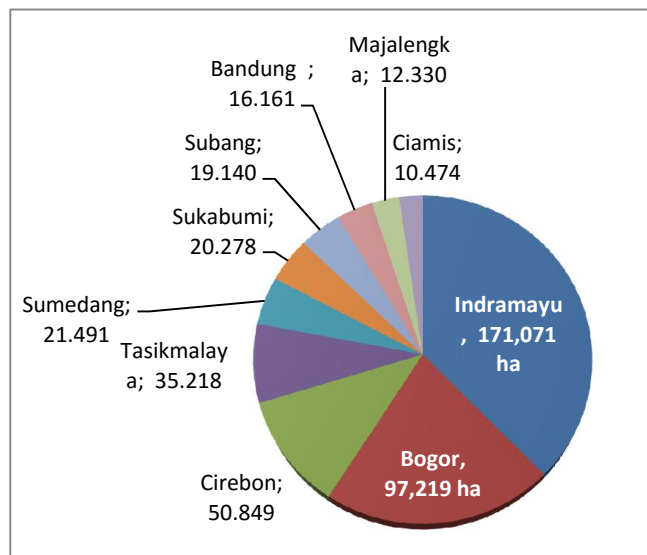
Areas prone to Strong wind could not be determined on a definite zone in West Java. Generally strong winds formed in the event of drastic weather changes and at the area that allow for changes in air pressure due to its slope. Some areas such as the northern coastal area and Purwakarta, Majalengka is an area that is prone to strong wind.

A climate disaster in the form of strong wind was relatively rare in the past. But lately the incidents of strong wind began to commonly occur with the speed that causes damage in some districts and cities. Based on data from BPBDs District Bandung in 2008, strong wind hit five villages in Bandung District, namely: Hamlet, Suka, Mekarwangi, Ibun, and Karyalaksana Ibun village. Hundreds of homes were mildly and severely damaged. Furthermore, in the Village District of Ciparai Pakutandang, strong wind was accompanied by hail. In a separate incident, strong wind also stroke Bojongsoang sub-district in Bandung District and damaged 2.585 houses in 2008.

Droughts

Drought is one of a natural disaster that has been closely linked to poverty, due to its impact to community livelihoods in the sectors of agriculture such as crop failure. It even has been linked further to food shortages, symptoms of malnutrition and even death. The most affected districts in West Java are Indramayu (171.071 ha), Bogor (97.219 ha), Cirebon (50.849 units) and Tasikmalaya (35.218ha) (Fig 4).

In particular, Indramayu and Bogor are more vulnerable to drought since considerable number of the residents work in agriculture



and forestry, 279.556 and 266.492 employments respectively.

Figure 4 Impacted lands by drought in West Java

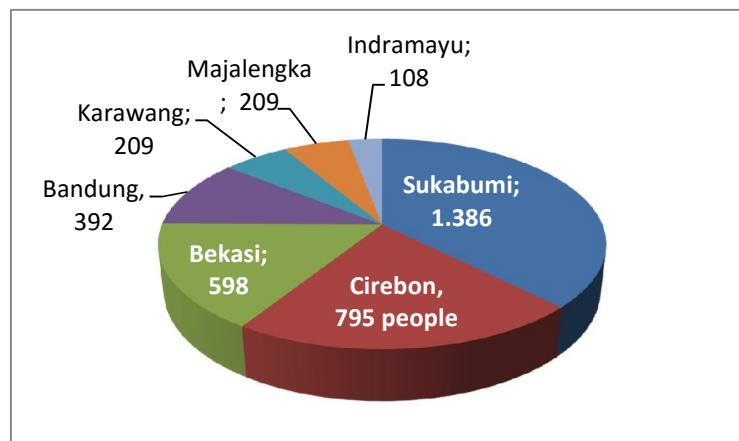
Coastal abrasion and sea level rises

Indonesia is vulnerable to sea level rise as high as [0.6 - 0.8] cm per year or as much as 1 meter within a period of 100 years (Ministry of National Development Planning / BAPPENAS, 2009). The most affected districts are Subang (1.043 people) and Indramayu (684 people), whereas in term of housing damaged, the most affected districts are Indramayu (200 unit), Sukabumi (145 units) and Cirebon (100 units).

Another form of disasters from sea is tidal wave, which affect mainly the fishermen. For example, due to tidal wave, hundreds of fishermen along the coast of South Garut could barely catch fish for few months in early 2015. Not only the fish caught were few but also the risk was high; the boat could be overturned by the coming waves, which was estimated as 5 billion rupiah loss from hundreds of damaged fishing boats along with their fishing instruments (Disnakkla, 2007). Similarly, the income of the fishermen was greatly reduced as the fishes caught were used solely for daily living. Another loss incurred by tidal wave was house damaged. It was reported that 100 unit of housing were damaged in the South Garut.

Epidemics

During the case of epidemic outbreak, the number of patients would significantly exceed the average number of patients. The highest prevalence of epidemic in West Java is found in Sukabumi District (1.386 people), Cirebon (795 people) and Bekasi (598 people)⁵ (Figure 5).



Source: analyzed from BNPB website (2014)

Figure 5. The number of affected people by epidemic in West Java

⁵ This data is obtained from BNPB website (http://dibi.bnpp.go.id/DesInventar/simple_data.jsp)

4.2. Geological and other hazards in West Java

Earthquakes

Earthquake is considered to be a high fatality disaster in West Java due to its impact and low preparedness of the community towards earthquake. In 2006 & 2009, the impacts of Earthquakes and Tsunami induced by earthquake (2006) claimed large number of casualties in term of economic impacts, number of dead and injured people. In a study at a densely populated sub-district of Bandung City, Sagala and Saraswati (2013) found that the area is very prone to earthquake due to limited space available for evacuation in times of earthquake events.

The most affected districts in term population impacted are Bandung (76 599 people), Garut (41 114 people), Tasikmalaya (34 149 people) and Ciamis (26 539 people). Similarly, in term of infrastructure damaged the most affected districts are Bandung (47 804 unit), Garut (46 550 unit), Tasikmalaya (45 416 unit) and ciamis (41 903 unit).

Another impact of earthquake is tsunami. Due to an earthquake of 6.8 magnitude in the South Java seashore in 2006, a tsunami event hit the southern part of West Java coast, namely Pangandaran beach and injured 450 people and caused 52,700 people to lose their homes.

Volcano eruption

Due to its geological formation from arc volcanoes, the West Java province has at least six active volcanoes namely Mt. Salak, Mt. Gede, Mt. Tangkubanperahu, Mt. Guntur, Mt. Galunggung, and Mt. Ciremai. All these mountains are categorized as normal-active, signifying their potential to erupt at in the future. The districts that are affected by volcanoes are **Garut** (10.929 people suffered and 46 000 ha of land damaged), Tasikmalaya (4.011 people affected) and **Bandung** district (1.500 people affected).

4.3. Summary

In term of impacted people, the most affecting disasters in West Java are flood (2.406.248 people), follow by drought (2.374.957 people) and earthquake (456.142). Similarly, in term of damaged housing, earthquake is singled out as the most affecting disaster, which has damaged a total number of 260.333 houses in 1815-2014. It is followed by flood which damaged 24.112 houses in West Java in the same period. The complete mapping of disaster impact and social vulnerability of children is presented in Figure 6 and 7.

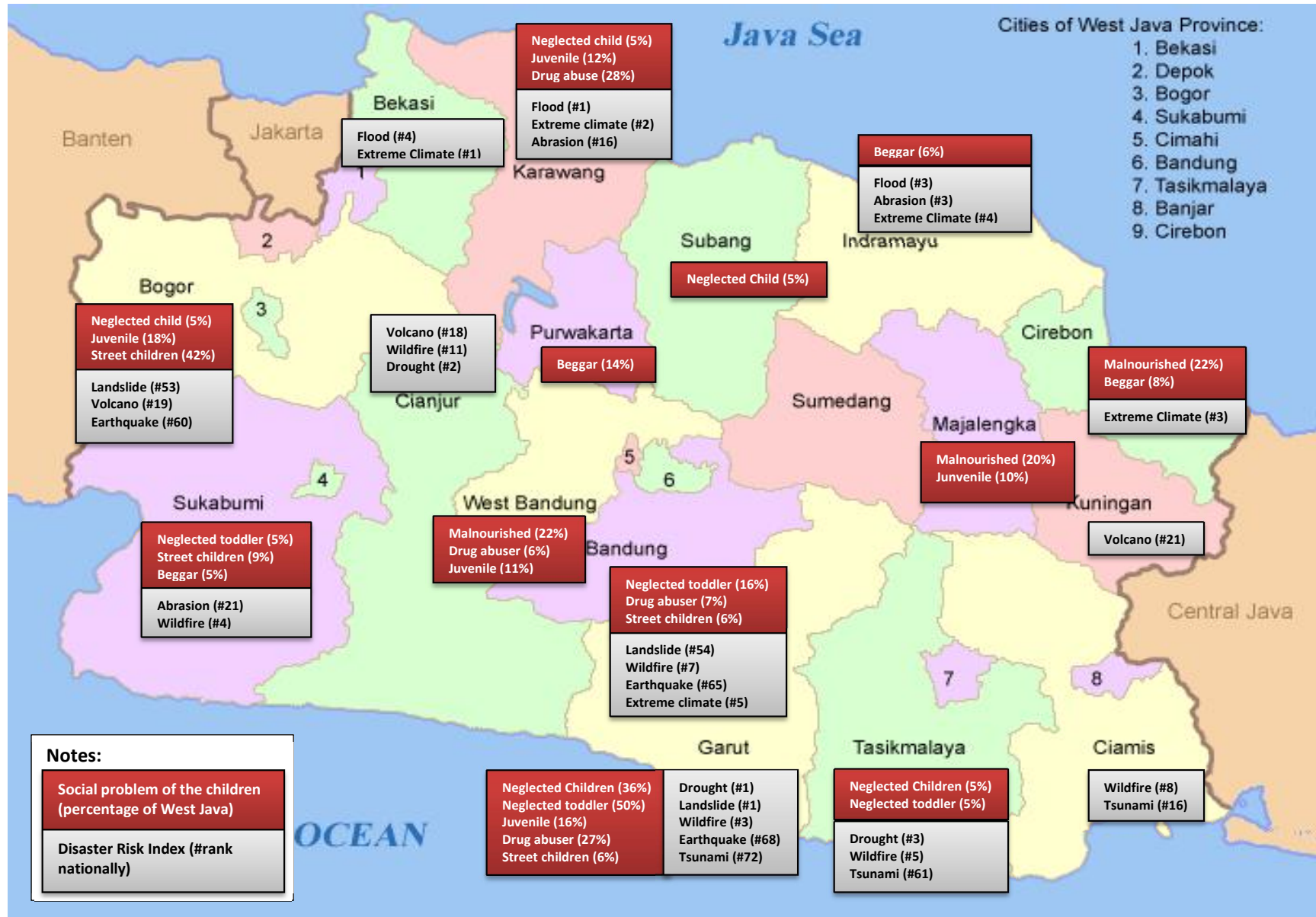


Figure 6. Map of disaster risk index and social problem faced by children in West Java

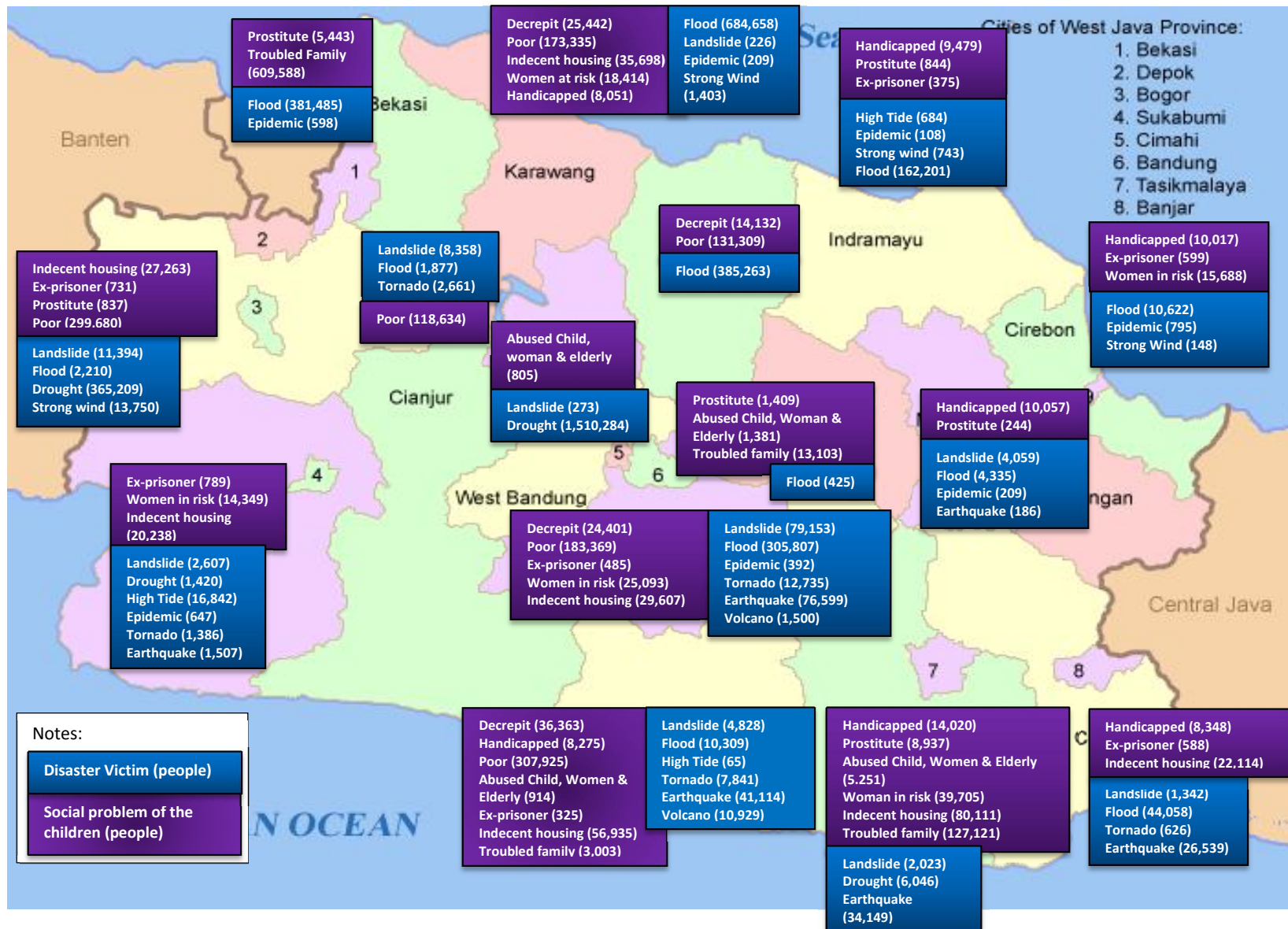


Figure 7. Map of disaster victim and social problem faced by children in West Java

5. Discussion

5.1. The impact of flood to children's education

The impact of flood to children's education can be observed in Baleendah sub-district in Bandung District. Baleendah district is located adjacent to the Citarum River. The condition causes the district to be flooded very frequently. According to the calculation of the *Balai Besar Wilayah Sungai* (BBWS) Citarum (2011), Baleendah district was included into the 1.000 hectare area that will never be from flooding.

A history of flooding in the village Baleendah began in the early 1990s. Since 2005 until now, there have been floods occurred in this district almost every year. The yearly flooding is caused mainly by two reasons: first, the ground level of Baleendah district is below the river level, second, the Citarum and Cisangkuy Rivers that flow through the Baleendah district had become shallow due to sedimentation.

The deepest depth of flood was recorded in 2010, when inundation was 3,5m depth. The recent incident in December 2014 was the worst incidents in 2 decades, recorded a 4-meter flood depth, spread accros Baleendah, Bojongsoang and Dayeuhkolot sub-district.



Figure 6 Elementary School Building in Cieunteung Village, Baleendah District, destroyed by flooding

The impact of yearly flooding was devastating. In the recent flood event, number of settlements affected by the floods reached more than ten thousand units and the number of evacuate were 12.000 people. Although the economic loss still cannot be estimated yet, the local residents were reported to be in traumatic condition, especially children (Susanti, 2014). Another impact was relocation of schooling activities. One of the worst impacted schools was SD Negeri Mekarsari in Cieunteung village. The condition had worsened due to frequent flooding that the building was no longer able to serve its purpose. Finally, the school activities were transferred to another elementary school outside the village of Cieunteung and the former building were simply

abandoned due to its situation and condition that was beyond repair. The school was merged into a primary school in an adjacent village. It was chosen due to its vicinity to the former school, which was according to the regulation from the Ministry of Education and Culture number 23 of 2013. The regulation stipulated that school location should be within 3 km of walking distance. However the capacity of the class obviously exceeded the maximum number of students which was 32 people.

5.2. The impact of drought to the poverty rate

West Java is ranked as the 3rd province in Indonesia that has the highest poor population (4.382.650 people), with poverty rate of 8,69 in 2013. As comparison, the total poor population in Indonesia is 28.553.930 people in 2013 (BPS, 2014). Further analysis of the districts those are most vulnerable is carried out by plotting the disaster risk index of each district to their respective poverty rate (Fig 7). From this analysis, the most vulnerable districts are Indramayu, Cirebon, Majalengka, Cianjur and Garut district.

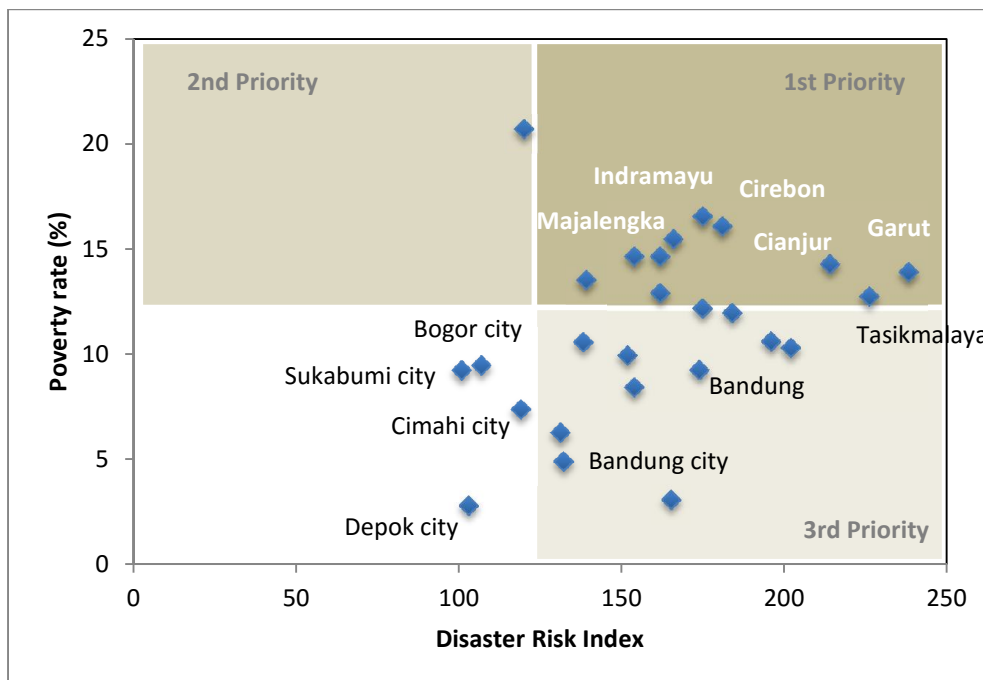


Figure 7. Correlation between disaster risk (2012) and poverty level (2010) in West Java

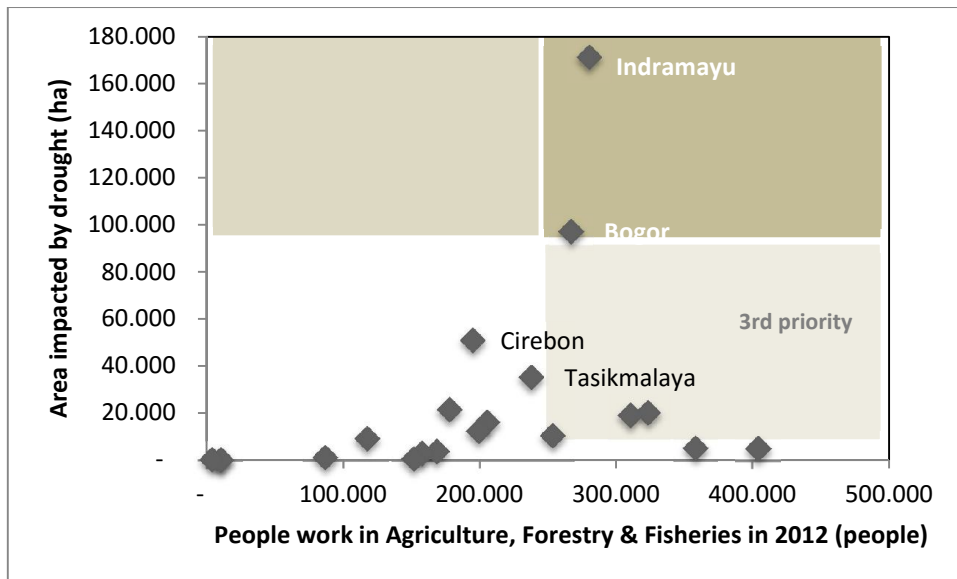
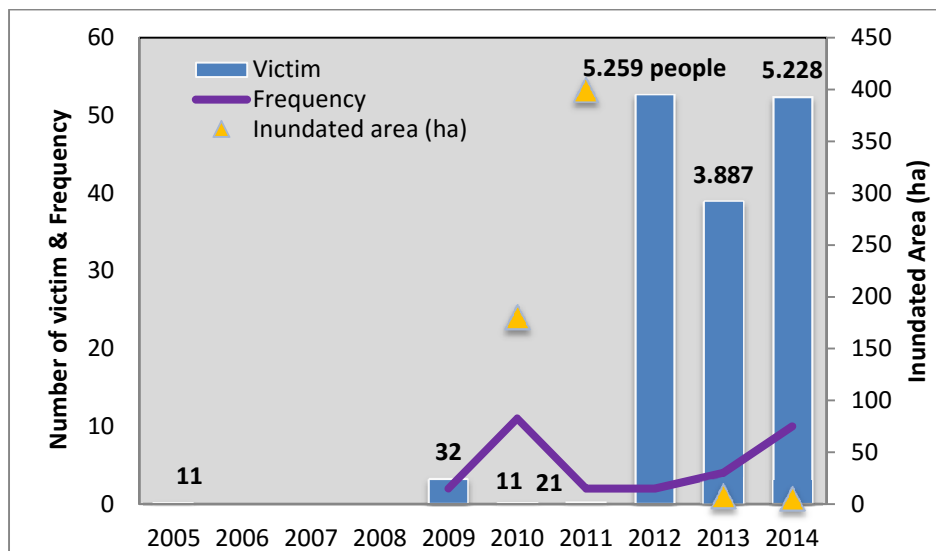


Figure 8. Vulnerability of Farmers and Fishermen to drought in West Java

The impact of drought to the poverty rate can be observed in Bandung and Garut districts. In 2014, Regional Disaster Management Agency (BPBD) reported that there were 5 regencies in West Java that were plagued by drought. Among which were Garut and Bandung regencies in addition to Tasikmalaya and Majalengka district, as well as Tasikmalaya city. This condition caused thousands of hectares of rice fields threatened by crop failures. By September 2014, there were 9,000 hectares of rice plants failed to be harvested, while another 120,000 hectares were already in dry condition, among which 2,700 ha located in Bandung District. The staggering number of affected area was because 70% (25,200 ha) of the rice field in Bandung district was rain-fed.



Source: Analyzed from BNPB

Figure 9. Flood History in Garut District

In Garut the drought impacted land was relatively lower, account for 678 ha in 2014. However, the rice production decreased by hundreds of tons rice.

In addition, due to drought dozens of villagers in Malangbong sub-district, Garut district had to queue all day to obtain clean water for cooking purposes from the local spring. The water was strictly limited to one bucket per family in order to accommodate the whole village. Whenever there was not enough water, they subsequently used the water in the paddy field for cleaning purposes. This routine was done almost every year during dry season. To overcome this, the local government provided pumps to irrigate the dry rice fields. Another measure was to drill and extract the water from the soil. However the pumps were not sufficient for the whole dry area and thus they settled a procedure of gili giring or rotated and allocated.

5.3. The impact of sea level rise to the loss of family income

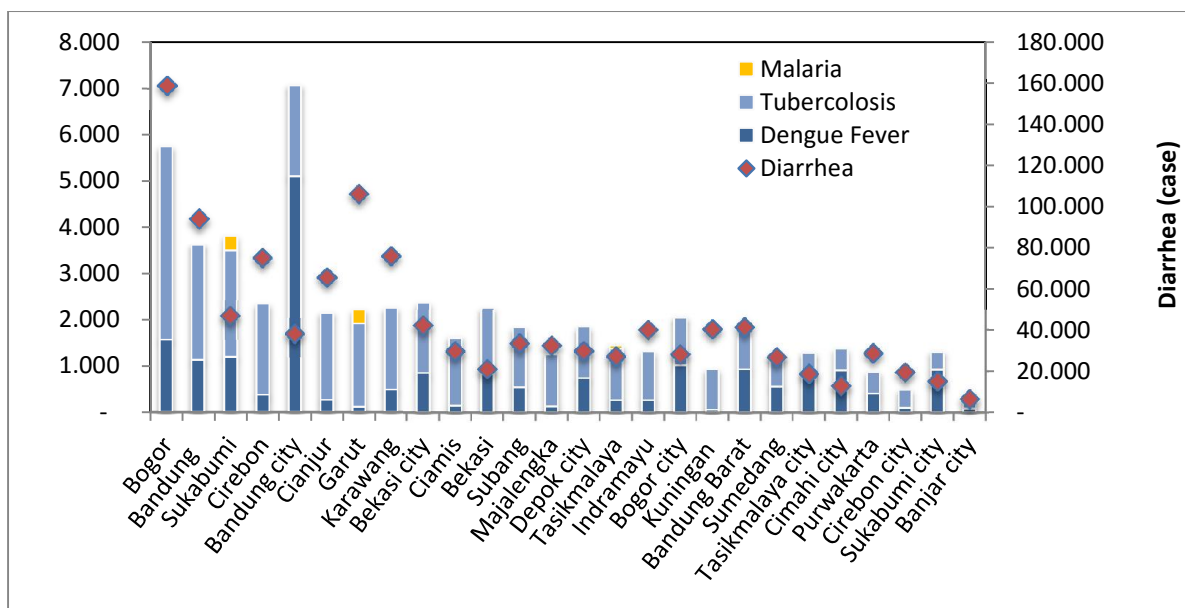
The impact of drought to the poverty rate can be observed in Garut coastal area. The most recent incidents of tidal wave in Garut happened in early 2015. During this time hundreds of fishermen along the coast of South Garut, West Java were impacted by the persistence of high tidal wave which caused scarcely fish caught in the last few months. The high sea waves and strong winds is one of the causes of the fishermen could not to sea. Not only the fish caught were few but also the risk was high; the boat could be overturned by the coming waves. This happened in the coastal south of Garut district, Reviews such as Cikelet and Caringin sub-district.

As the result, the income of the fishermen was greatly reduced. The fishes caught were used barely for daily living. Thus in order to increase their income they have to diversified their livelihood.

However, the highest magnitude of tidal wave incident was in 2007. In 2007, six sub-districts in Garut was stricken by tidal wave. The loss caused from tidal wave was estimated as 5 billion rupiah. The loss was from the hundreds of damaged fishing boats along with their fishing instruments (Disnakkanla, 2007). The prevention measure taken by the fishermen was to not go fishing at all for around one month. Another loss incurred by tidal wave was house damaged. It was reported that 100 unit of housing were damaged.

5.4. The impact of disaster to the health

The diseases that are closely related to disaster incidences are diarrhea and dengue fever. In term of dengue fever, the highest prevalence was found in Bandung City (5.096 case), Bogor District (1.570 case), Sukabumi (1.189 case) and Bandung District (1.127 case) in 2012 (BPS, 2013). In the case of diarrhea, the most affected district was Bogor district (159.013 cases), Garut District with (105.889 cases), and Bandung District (94.085 cases) in 2012 (Health Service of West Java, 2013). Overall, the regencies that persistently plagued by epidemic were **Sukabumi**, **Cirebon** and **Bandung** District. Moreover, it was reported that in West Java province, the accident and disaster have caused disabilities to the 15.2% of the total population of disable people.



Source: Summarized from *West Java in Number*, BPS (2013)
Figure 10. The number of infectious disease in West Java in 2012

6. Conclusions and Recommendation

West Java province has considerable challenges from coping with disaster experiences in the previous decades. This has caused various impacts such as epidemics, injuries, casualties, housing and infrastructure damages which eventually contribute to the economic losses and the level of poverty in the province. The most frequent disaster in West Java is flood, while the most destructive is earthquake. The vulnerability of West Java province apart from disaster experience is relatively high due to its high poor population. Disaster impacts that are observed toward the children in West Java are disruption to education activities and losses of income to the fishermen and farmers. This paper conclude that in districts that have high prevalence of disasters, the social problem faced by children is also high. The districts are Garut, Tasikmalaya and Bandung districts. These districts could be categorized as the most vulnerable district and consequently the government should focus their efforts in alleviating the disaster impact in these districts in order to suppress the possible subsequent impacts towards children. The government could do so by strengthening the livelihood of the community in order to increase the household resiliency. In many cases, the children have to help their family to recovery their financial loss by working instead of going to school. Sometimes because of limited option are available for children to earn money, they resort to the worst form of employment such as begging at streets, being cheap labor at factories, or domestic worker. Another type of negative coping strategy is early marriage. Thus, only that the family unit can function properly and gaining livelihood resiliency that the children would be safe from social problem and even resuming their education activities after disaster events.

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