COVID-19 IN WEST JAVA

By Himawan Adityas

I. Introduction to the Problem

After a year Covid-19 pandemic has spreaded to a whole countries in the world, one of coutries is Indonesia. Covid-19 has entered to Indonesia at March 2020 at Bogor City in West Java. The early, Covid-19 infected 2 residents in Bogor City, then the virus were spread to Jabodetabek and finally spread to all cities in Indonesia. Every single day, amount of residents that infected increase from tens to thousands and nowaday that amount of residents infected were more than a million. This phenomenon makes the government try to reduce the infected spread rate with social distancing, wearing the masker, and using hand sanitizer frequently. That thing were efectively steps to reduce the infected spread rate in all cities. At the other hand if we see the problem from different point of view especially in the business, we will get more profit due to each people have to have masker and hand sanitizer stock in their home. Therefore selling masker and hand sanitizer is very profitable. The effectively strategic will helps we business to be effective. The business strategic is find the area which is high infected spread rate. If we see from government point of view, the goverment needs give strict regulation of social distancing at area which is high infected spread rate. From both of point of views, they has the same of purpose to reducing infected spread rate of Covid-19 in Indonesia.

II. Data

To knowing and analyzing the problem, we need relevant data. For this case, we need infect spread rate of covid-19 form each regencies in West Java and geospatial data of regencies in West Java . The data contains 6 variables or fields i.e. positive infect rates case daily and totaly, recovered case daily and totaly, and deaths case daily and totaly. The data able to get from West Java government website that handling Covid-19 case. The website is PIKOBAR JAWA BARAT.

III. Methodology

Below the steps of methodology of covid-19 analysis.

1. Importing the data form PIKOBAR JAWA BARAT and geospatial data of regencies.

	tanggal	kode_prov	nama_prov	kode_kab	nama_kab	closecontact_total	closecontact_discarded	closecontact_dikarantina	suspect_total	suspect_discarded
0	2020-08-01	32	Provinsi Jawa Barat	3203	KAB. CIANJUR	0	0	0	0	0
1	2020-08-01	32	Provinsi Jawa Barat	3211	KAB. SUMEDANG	0	0	0	0	0
2	2020-08-01	32	Provinsi Jawa Barat	3210	KAB. MAJALENGKA	0	0	0	0	0

	regency	lat	long
0	KAB. ACEH BARAT	4.4543	96.1527
1	KAB. ACEH BARAT DAYA	3.7963	97.0068
2	KAB. ACEH BESAR	5.4529	95.4778

Fig 3.1 Covid-19 data from PIKOBAR JAWA BARAT (*above*)

Fig 3.2 Geospatial data of regencies in Indonesia (*left side*)

2. Change the column name and drop the data which regencies data is unknown regencies.
3. Change data type of date column to datetime data type using `pd.to_datetime()`.
4. Using only 8 columns of covid-19 data.

```
data = data[columns]
data.rename(columns={'tanggal':'date',
                     'nama_kab':'regency',
                     'confirmation_total':'confirmation',
                     'confirmation_selesai':'recovered',
                     'confirmation_meninggal':'deaths',
                     'pertumbuhan_confirmation_total':'daily_confirmation',
                     'pertumbuhan_confirmation_selesai':'daily_recovered',
                     'pertumbuhan_confirmation_meninggal':'daily_deaths'}, inplace=True)
```

Fig 3.3 Rename columns

5. Merging the covid-19 data with geospatial data by regencies using `pd.merge()`.
6. Visualizing total confimation, recovered, and deaths cases in the last of date using *matplotlib*.
7. Visualizing bubble marker map of total confimation, recovered, and deaths cases for each regencies in the last of date using *folium*.
8. Visualizing the 6 highest of daily case rate of confirmation, and deaths cases for each regencies.

IV. Results

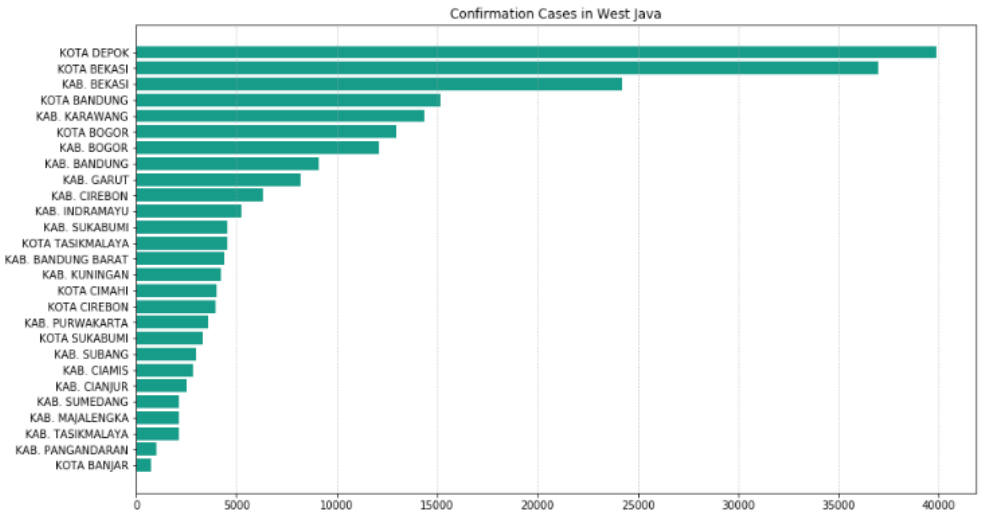

Fig 4.1 Total confimation cases for each regencies

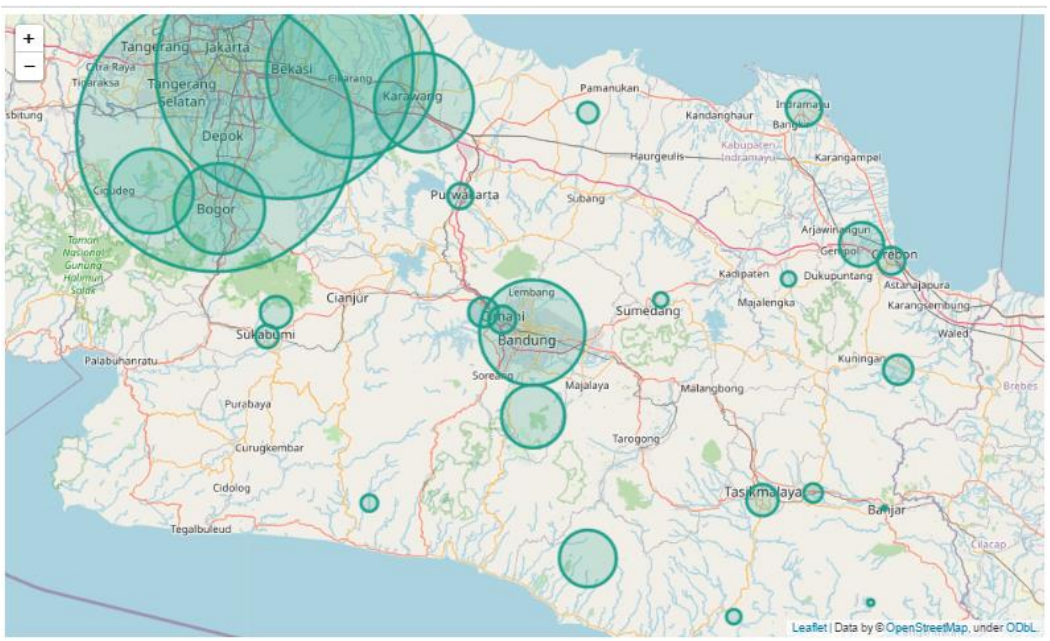

Fig 4.2 Bubble map of confirmation cases for each regencies

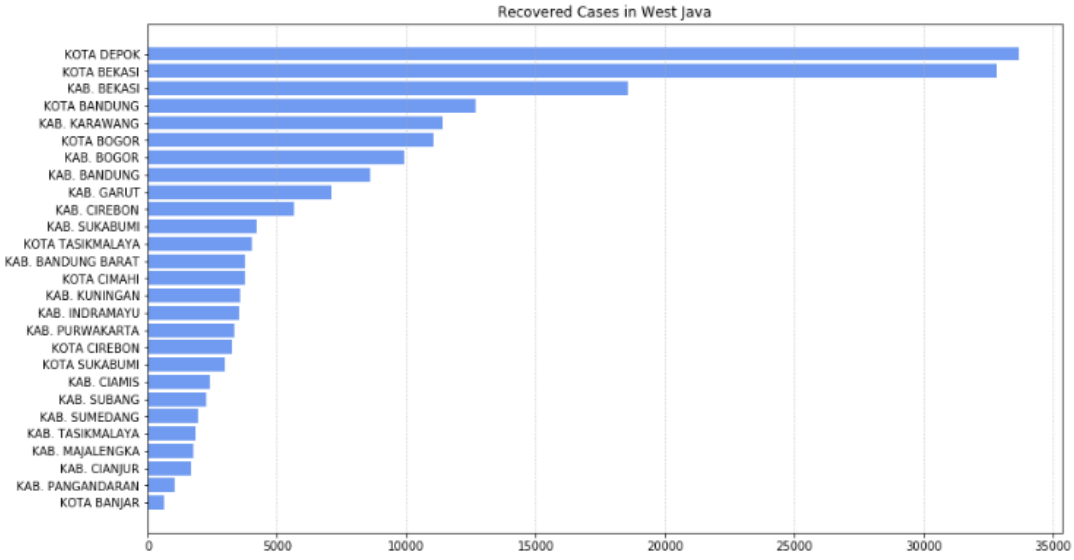

Fig 4.3 Recovered case for each regencies

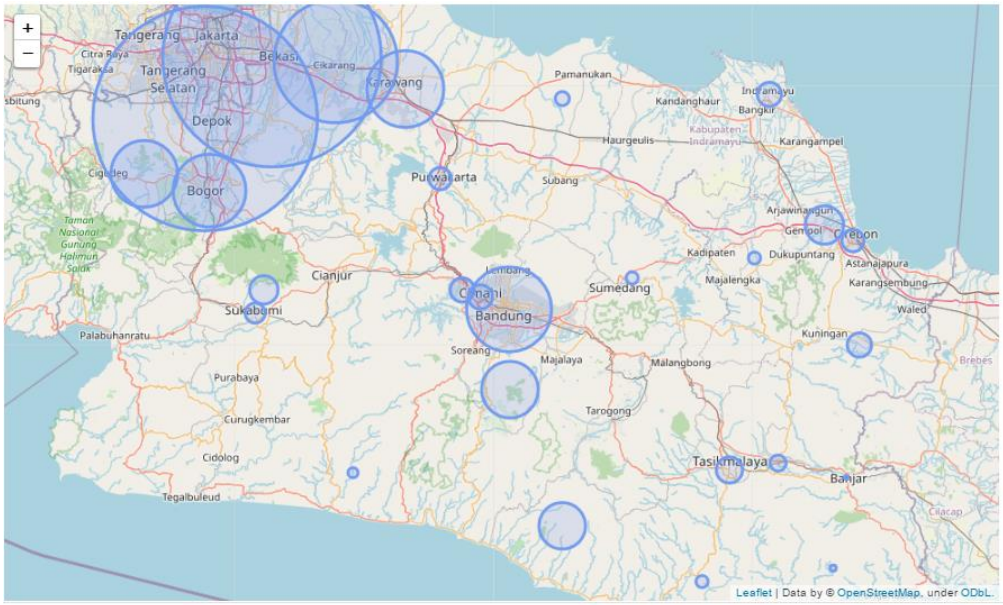

Fig 4.4 Bubble map of recovered case for each regencies

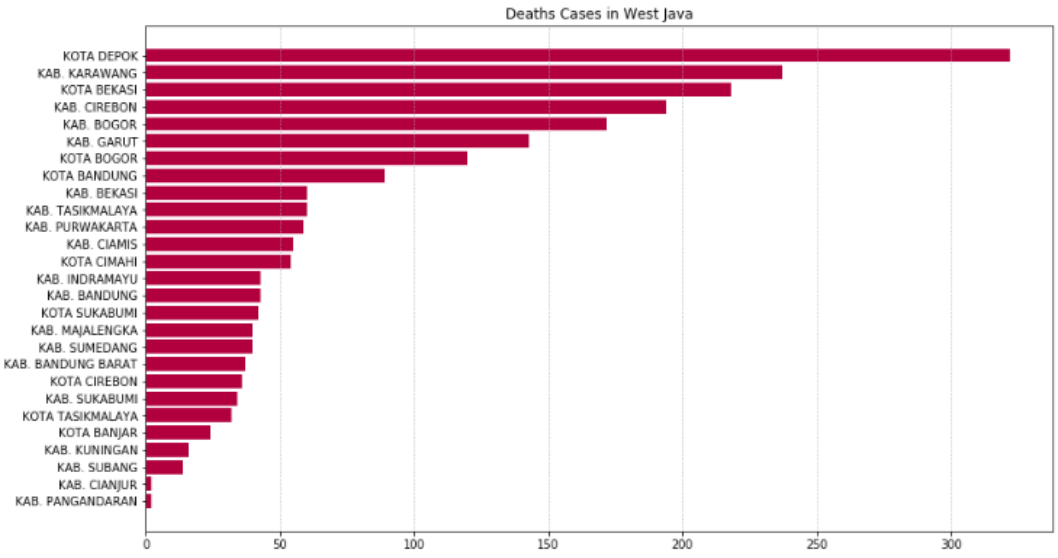

Fig 4.5 Deaths case for each regencies

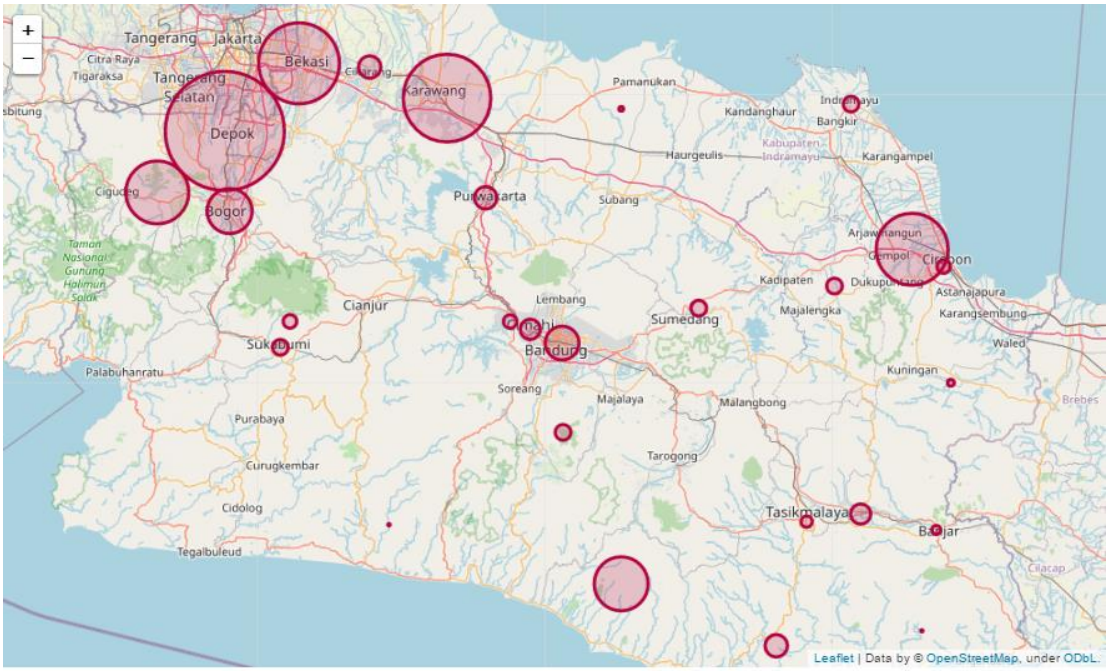

Fig 4.6 Bubble map of deaths case for each regencies

In **Fig 4.1** there is a graph visualizing the total confirmation cases for each regencies. In the graph, Depok City occupies the highest position, reaching nearly 40,000 (fourty thousand) cases and followed by Bekasi City in the second place with a total of more than 35,000 (thirty five thousand) cases. In contrast, the first and second lowest total cases occurred in Banjar regency and Pangandaran regency where the total cases were only less than 2,000 cases. From these data, the main factor of the rate of distribution is the distance from the city center, capital city and regional and national business centers. Because of this, a lot of people came and went out of that area or city. Like the Depok city and Bekasi city, the two cities are very close to the national business center and at the same time the capital city of Jakarta so that a lot of people who come from Jakarta go to Depok and Bekasi cities and vice versa. So that the spread rate becomes fast. It should be noted that Jakarta is the city with the highest cases in Indonesia. For more details, as in **Fig 4.2** which illustrates that the city of Depok and Bekasi are close to Jakarta.

For **Fig. 4.3 and Fig. 4.4** it is the same as the confirmation case. Because both cities have high confirmed cases, it is very possible to recover as well as high, so it can be said that the high number of confirmed cases will be proportional to the high number of cases recovered, in terms of good health care.

Fig 4.5 and **Fig 4.6** are similar to cured cases where case death will have a high probability of high confirmed cases.

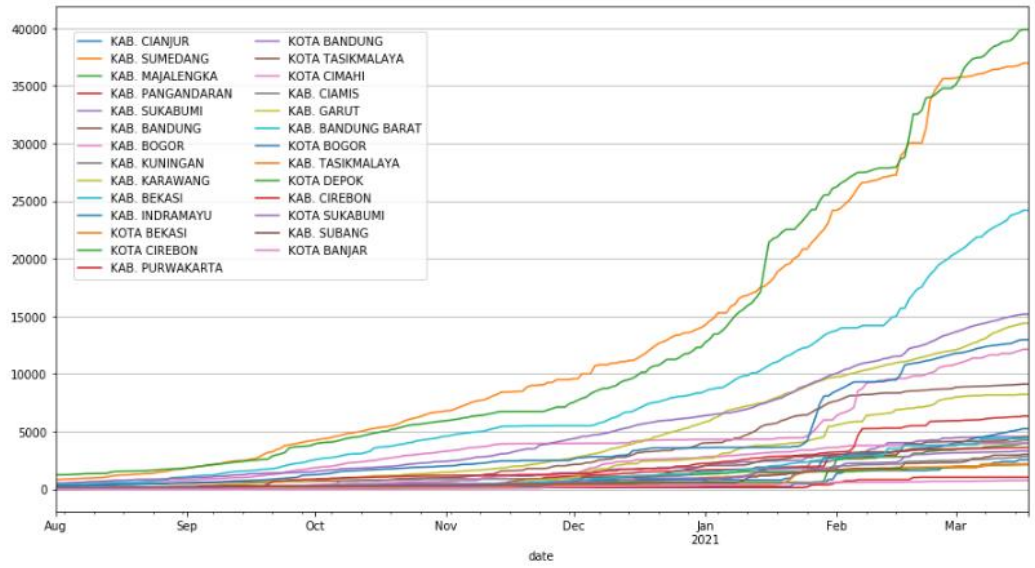

Fig 4.7 Total confirmation cases from August 2020 to March 2021

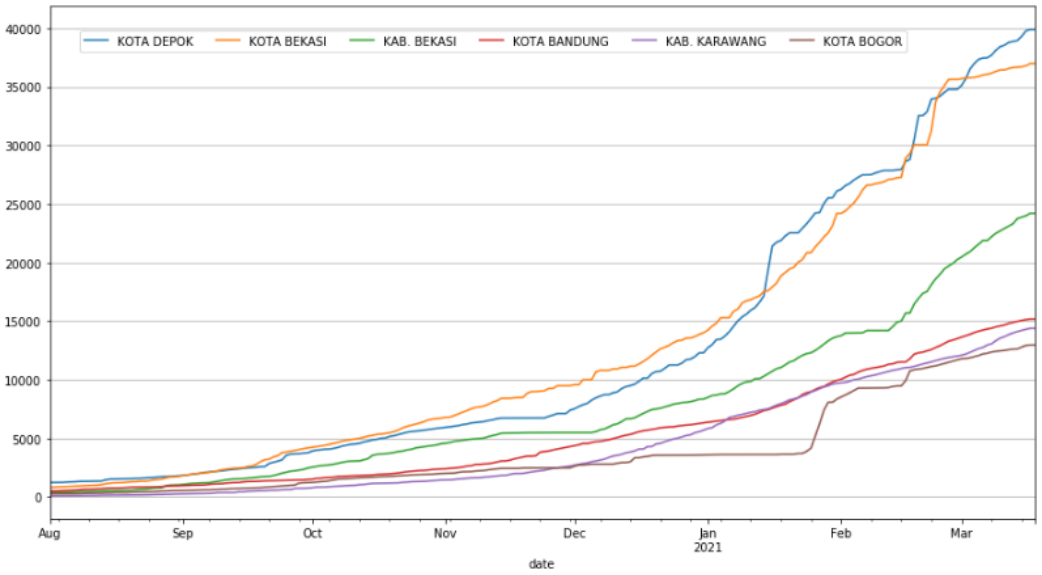

Fig 4.8 Top 6 the highest total confirmation cases

Fig 4.7 and **Fig 4.8** illustrates that there is an increase in cases per day from each regencies. The sloping of the resulting graph, the less daily case growth. Conversely, the steeper the graph, the greater the daily case growth.

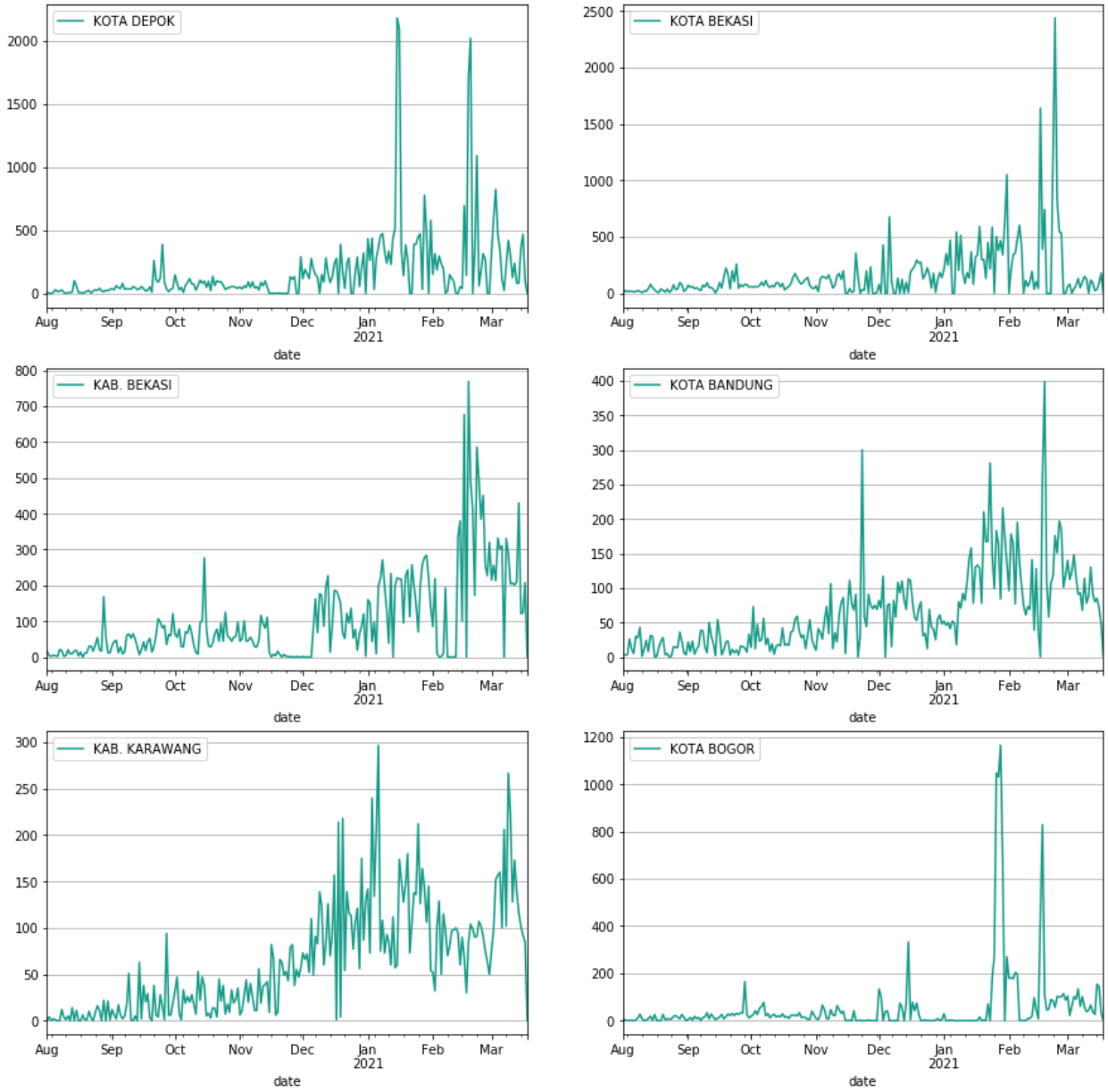

Fig 4.9 Daily confirmation cases of top 6 the highest total confirmation cases regencies

Based on the graph above, the average growth of confirmed cases has increased in the last 4 - 5 months (November to now) even there is a sharp increase in a day. This is due to several factors but the factors that have a high probability are the fact that many WFO (for the employees in Jakarta) have been implementation of social distancing regulations have decreased so that there has been a spike in the last 5 months in the 6 regencies above.

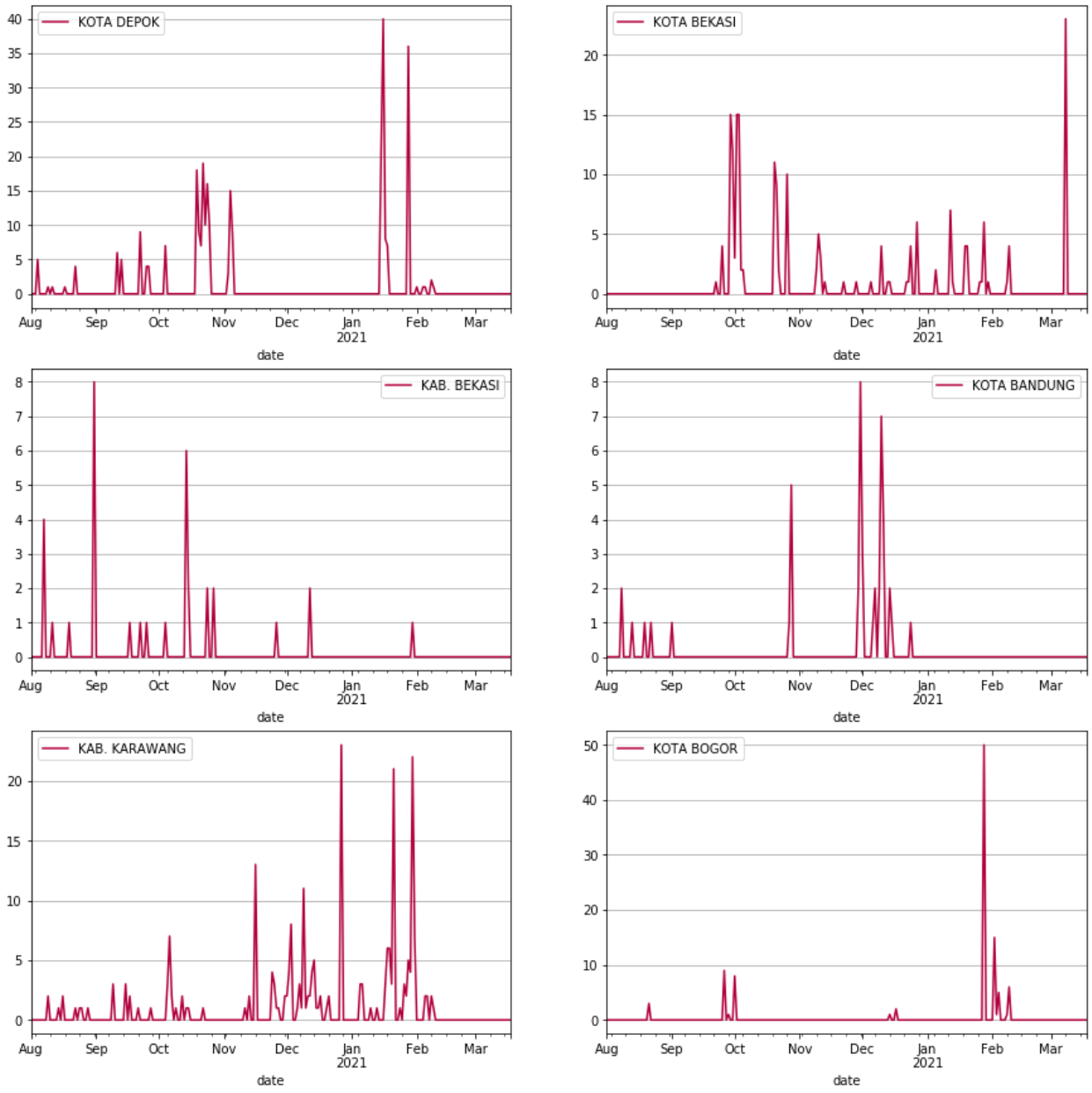

Fig 4.10 Daily deaths cases of top 6 the highest total confirmation cases regencies

Based on the graph above, the growth in cases of death due to Covid-19 is on average less in January to present. This is the success of the medical team and government in dealing with this pandemic.

V. RECOMMENDATION

Based on the results that have been discussed, that the distance factor between cities is very influential on the growth rate of cases. Therefore, it is highly emphasized to comply with government regulations such as social distancing, wearing masks and frequently using hand sanitizers. This simple rule will be very helpful if we want to go out of town. Then from that APDA, maintaining the body's immune system is very necessary to avoid this virus.

VI. CONCLUSION

- High confirmation cases occurs in Depok city, Bekasi city, Bekasi regency due to the regencies is closer to Jakarta.
- Total of recovered case has directly proportional to total confirmation cases for each regencies.
- Daily cases of confimation cases increase on the last 5 months.
- Daily cases of deaths cases decrease on January until now.