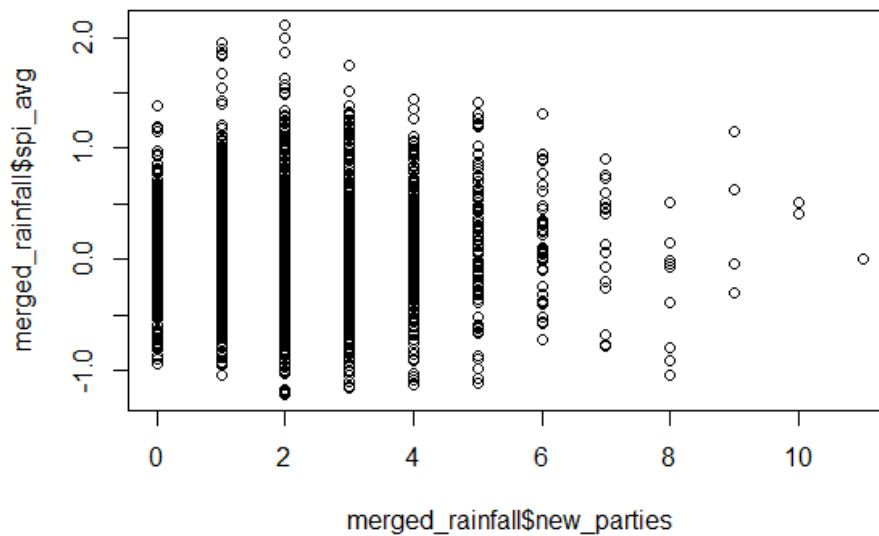
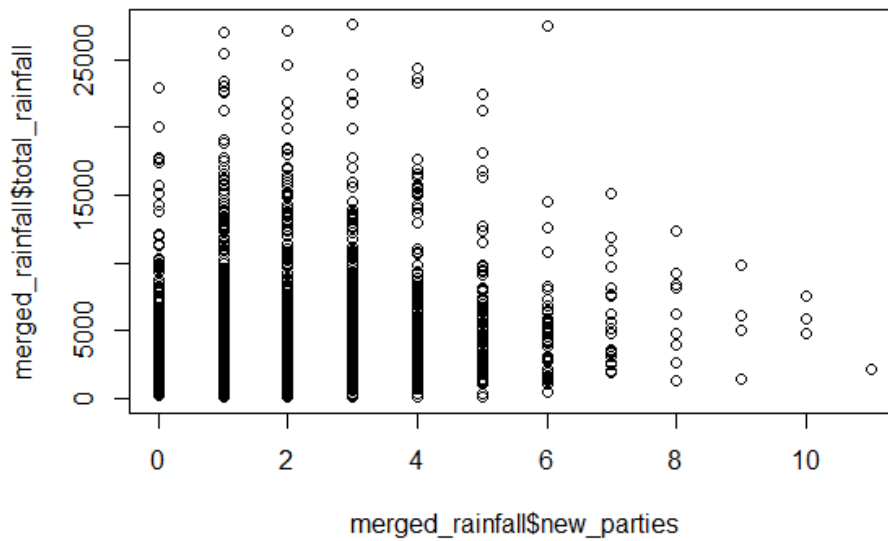


- 1> A> The total rainfall and average SPI were calculated starting from the year after previous election to current election year. The rainfall table was joined with the borders table and finally added to the districts table.



We see some signs that new parties are formed when there are extreme conditions. But we cannot say for sure. Further analysis needs to be done.

b> The lag function was used to calculate desired metrics

```
merged_rainfall_neighbors$previous_rainfall_neighbor<-lag(merged_rainfall_neighbors$total_rainfall_neighbors,1)
```

We want to see if there's any relationship between the current level of rainfall in a district and its lagged value as well as its neighbor's lagged value

# Coefficients:

#	Estimate	Std. Error	t-value	Pr(> t )
# previous_rainfall	0.250420	0.026765	9.3563	< 2.2e-16 ***
# previous_rainfall_neighbor	0.017121	0.005386	3.1787	0.001507 **

We can see that previous rainfall in a particular district and its neighbor's rainfall are significant predictors for current rainfall in a district. It also has a positive sign which means that current rainfall in a district increases when the previous rainfall in the district and previous neighbors' rainfall increases. This makes sense.

c> Similar to b, we will see if extreme weather in a district is influenced by previous rainfall in a district and its neighbors

#	Estimate	Std. error	t value	Pr(> t)
# previous_rainfall	7.366e-05	1.942e-05	3.792	0.000149 ***
# previous_rainfall_neighbor	-1.621e-05	3.943e-06	-4.111	3.95e-05 ***

Again, the previous rainfall and neighbor's rainfall seem to be significant predictors. Although, the previous rainfall of the neighbor seems to be more significant than in b) and also has a negative coefficient/estimate. This says that number of times extreme weather is experienced in a district is negatively influenced by the level of rainfall in the neighboring districts. Further investigation needs to be done to make sense of this finding.

2> We want to see if more parties are formed when there is extreme weather. Number of years in an election period was added as a control.

#	Estimate	Std. error	t value	Pr(> t)
# total_flood_drought	0.05011	0.02016	2.486	0.012926 *
# number_of_election_yrs2	0.75994	0.23087	3.292	0.000996 ***
# number_of_election_yrs3	1.04316	0.23074	4.521	6.15e-06 ***
# number_of_election_yrs4	0.52083	0.22908	2.274	0.022989 *
# number_of_election_yrs5	0.51120	0.23350	2.189	0.028578 *
# number_of_election_yrs6	-0.05500	0.24239	-0.227	0.820509

We see that number of new parties formed is influenced positively and significantly by the number of times a district experiences extreme weather. To further investigate let us see if any type of party is more likely to be formed.

```
#Socialist_parties
summary(pglm(new_parties_socialist~total_flood_drought+number_of_election_yrs,
data=merged_rainfall_df, effect = "twoways", model = "within",
index=c("district","Election_period.y"), family = "poisson"))
```

# Estimates:

#	Estimate	Std. error	t value	Pr(> t)
# total_flood_drought	0.13015	0.04762	2.733	0.00628 **
# number_of_election_yrs	-0.25885	0.03182	-8.136	4.09e-16 ***

```
#Secular
```

```
summary(pglm(new_parties_secular~total_flood_drought+number_of_election_yrs,
data=merged_rainfall_df, effect = "twoways", model = "within",
index=c("district","Election_period.y"), family = "poisson"))
```

# Estimates:

#	Estimate	Std. error	t value	Pr(> t)
# total_flood_drought	0.20915	0.08054	2.597	0.00941 **
# number_of_election_yrs	-0.32077	0.05297	-6.056	1.4e-09 ***

```
#Farleft
```

```
summary(pglm(new_parties_farleft~total_flood_drought+number_of_election_yrs,
data=merged_rainfall_df, effect = "twoways", model = "within",
index=c("district","Election_period.y"), family = "poisson"))
```

	Estimate	Std. error	t value	Pr(> t)
total_flood_drought	0.06633	0.03871	1.713	0.0866 .
number_of_election_yrs	-0.19261	0.02538	-7.588	3.24e-14 ***

**It seems like Socialist, Secular and Far left parties are likely to be performed when there is extreme weather. This makes sense.**

3>

We want to see if the number of political parties formed is dependent on the number of times its neighbors experience extreme weather in a previous election period. We already saw that the degree of political foundings is dependent on the total number of times a district experiences extreme weather. From the below estimates, we see that the number of times neighbors experience extreme weather also influences the number of political foundings in a particular district.

	Estimate	Std. error	t value	Pr(> t)
previous_neighbor_drfl	0.017331	0.005893	2.941	0.00327 **
total_dfl	-0.008428	0.005172	-1.629	0.10321

4>

We want to see if political concentration is influenced by factors as in 3>

#	Estimate	Std. error	t value	Pr(> t)
# previous_neighbor_drfl	0.0212998	0.0001816	117.3	<2e-16 ***
# total_dfl	0.0260027	0.0001714	151.7	<2e-16 ***

We see that political concentration is positively influenced by extreme weather conditions in a district and its neighbors. This result is counter-intuitive as we have seen that new parties are more likely to be formed when there is extreme weather. It may be possible that the already existing socialist parties attract a majority of the vote share even though new parties are formed. Further investigation needs to be done.

5>

Let us first see if the new parties which have not been formed in neighboring districts depend on the extreme weather in a district or its neighbors.

#	Estimate	Std. error	t value	Pr(> t)
# previous_neighbor_drfl	-0.002199	0.007620	-0.289	0.77292
# total_dfl	0.006692	0.007110	0.941	0.34661
# number_of_election_yrs2	-0.208647	0.294679	-0.708	0.47892
# number_of_election_yrs3	0.311142	0.273789	1.136	0.25578
# number_of_election_yrs4	-0.307444	0.291641	-1.054	0.29180
# number_of_election_yrs5	-0.300995	0.280497	-1.073	0.28324
# number_of_election_yrs6	-0.784656	0.291792	-2.689	0.00716 **

Previous extreme conditions in neighboring districts nor extreme conditions in the current district seem to influence forming of brand new parties. This gives us an indication that they may be formed to address other economic concerns. Further exploration needs to be done here.

Let us now see if new parties formed in a district which have appeared in a previous neighboring district are influenced by the extreme weather.

	Estimate	Std. error	t value	Pr(> t)
previous_neighbor_drfl	-0.021476	0.010092	-2.128	0.0333 *
total_dfl	-0.008873	0.011464	-0.774	0.4389
number_of_election_yrs	-0.169452	0.034280	-4.943	7.69e-07 ***

We see that the number of parties formed is dependent on extreme weather in neighbors in a previous election period. But the coefficient is negative and counter-intuitive. Further investigation needs to be done.

In general, we expect the forming of new parties which have already contested in a neighboring district to be influenced by extreme weather conditions in a that district. This would show the diffusion of parties due to extreme weather. We also observe that the formation of brand new parties in a district is not really dependent on extreme weather conditions, which makes sense as there may be other issues. But further investigation and more time needs to be spent to ascertain this.