

Group_9_Analysis

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3/7/2022

Rows: 1,145

Columns: 8

```
$ country_of_origin <chr> "Myanmar", "Uganda", "Ethiopia", "Mexico", "Burun~  
$ aroma <dbl> 7.25, 8.33, 8.42, 7.17, 7.75, 7.92, 7.92, 7.83, 7~  
$ flavor <dbl> 7.42, 7.92, 8.00, 7.08, 7.67, 7.75, 7.83, 7.67, 6~  
$ acidity <dbl> 7.50, 7.92, 8.00, 7.25, 7.50, 7.75, 7.67, 7.58, 7~  
$ category_two_defects <dbl> 4, 1, 7, 3, 5, 0, 1, 2, 2, 1, 0, 8, 0, 2, 0, 0, 2~  
$ altitude_mean_meters <dbl> 1219.20, 1600.00, 1700.00, 1300.00, 1880.00, 1400~  
$ harvested <dbl> 2015, 2013, 2014, 2012, 2012, 2014, NA, 2015, 201~  
$ Qualityclass <chr> "Poor", "Good", "Good", "Poor", "Good", "Good", "~
```

[1] 0.5135371

Table 1: Summary statistics of altitude mean meters and harvested.

Variable	Mean	SD	Min.	1st Q.	Median	3rd Q.	Max.
aroma	7.57	0.39	0	7.42	7.58	7.75	8.75
flavor	7.52	0.40	0	7.33	7.58	7.75	8.67
acidity	7.54	0.39	0	7.33	7.50	7.75	8.58
category_two_defects	3.67	5.41	0	0.00	2.00	5.00	55.00
altitude_mean_meters	1850.69	9392.09	1	1100.00	1310.64	1600.00	190164.00
harvested	2013.67	1.81	2010	2012.00	2014.00	2015.00	2018.00

Table 2: Summary statistics of the sepal length by species of irises

country_of_origin	number_of_batch	Proportion_of_good_quality
Brazil	116	0.47
Burundi	2	0.50
China	14	0.64
Colombia	158	0.80
Costa Rica	41	0.56
Cote d'Ivoire	1	0.00
Ecuador	3	0.33
El Salvador	20	0.70
Ethiopia	38	0.92
Guatemala	152	0.50
Haiti	5	0.20
Hawaii	62	0.55
Honduras	48	0.25
India	10	0.50
Indonesia	16	0.56
Japan	1	1.00
Kenya	24	0.92
Laos	2	0.00
Malawi	11	0.09
Mauritius	1	0.00
Mexico	203	0.27
Myanmar	6	0.00
Nicaragua	23	0.22
Panama	4	0.75
Peru	9	0.56
Philippines	5	0.40
Puerto Rico	3	0.33
Taiwan	62	0.42
Tanzania	32	0.50
Thailand	23	0.70
Uganda	32	0.78
United States	9	0.67
Vietnam	8	0.50
Zambia	1	0.00

Table 3: Summary statistics of the sepal length by species of irises

Variable	Qualityclass	n	Mean	SD	Min	Median	Max	IQR
aroma	Good	588	7.76	0.23	7.08	7.75	8.75	0.08
aroma	Poor	557	7.37	0.41	0.00	7.42	8.25	0.16
flavor	Good	588	7.74	0.23	7.00	7.67	8.67	0.16
flavor	Poor	557	7.29	0.42	0.00	7.33	8.08	0.17
acidity	Good	588	7.72	0.25	6.75	7.67	8.58	0.16
acidity	Poor	557	7.34	0.40	0.00	7.33	8.33	0.17
category_two_defects	Good	588	2.87	3.82	0.00	2.00	40.00	2.00
category_two_defects	Poor	557	4.52	6.60	0.00	2.00	55.00	4.00

Table 4: Summary statistics of continuous variables by quality of coffee

Variable	Qualityclass	n	Mean	SD	Min	Median	Max	IQR
aroma	Good	588	7.76	0.23	7.08	7.75	8.75	0.08
aroma	Poor	557	7.37	0.41	0.00	7.42	8.25	0.16
flavor	Good	588	7.74	0.23	7.00	7.67	8.67	0.16
flavor	Poor	557	7.29	0.42	0.00	7.33	8.08	0.17
acidity	Good	588	7.72	0.25	6.75	7.67	8.58	0.16
acidity	Poor	557	7.34	0.40	0.00	7.33	8.33	0.17
category_two_defects	Good	588	2.87	3.82	0.00	2.00	40.00	2.00
category_two_defects	Poor	557	4.52	6.60	0.00	2.00	55.00	4.00

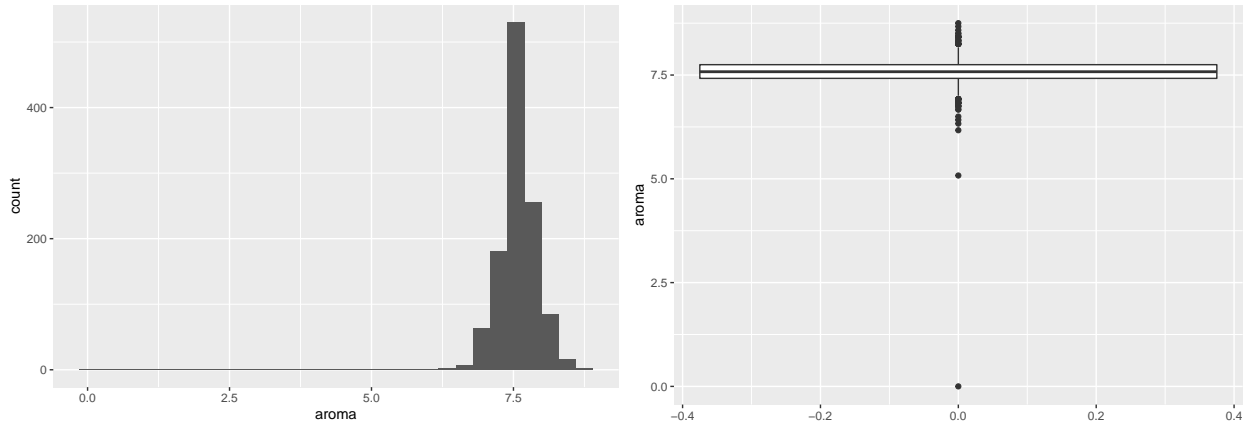


Figure 1: Histogram and boxplot for aroma.

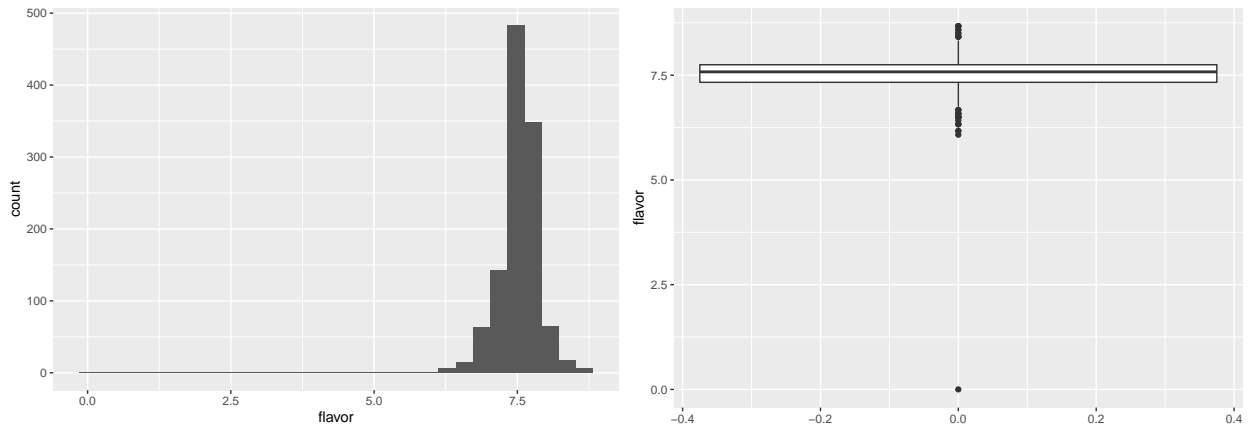


Figure 2: Histogram and boxplot for flavor.

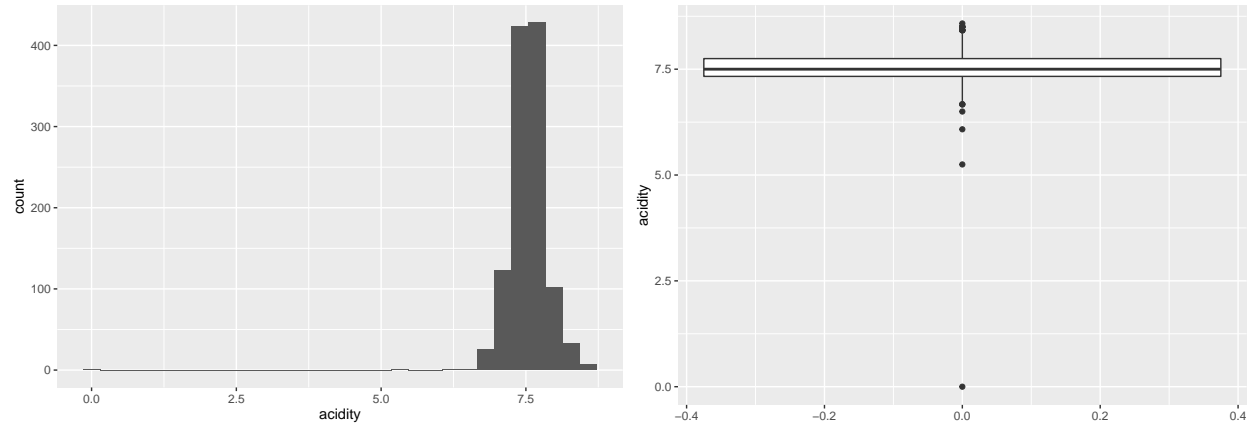


Figure 3: Histogram and boxplot for acidity.

```
# A tibble: 1 x 8
  country_of_origin aroma flavor acidity category_two_defects altitude_mean_met~
  <chr>          <dbl> <dbl> <dbl>          <dbl>          <dbl>
1 Honduras            0     0     0              2          1400
# ... with 2 more variables: harvested <dbl>, Qualityclass <chr>
```

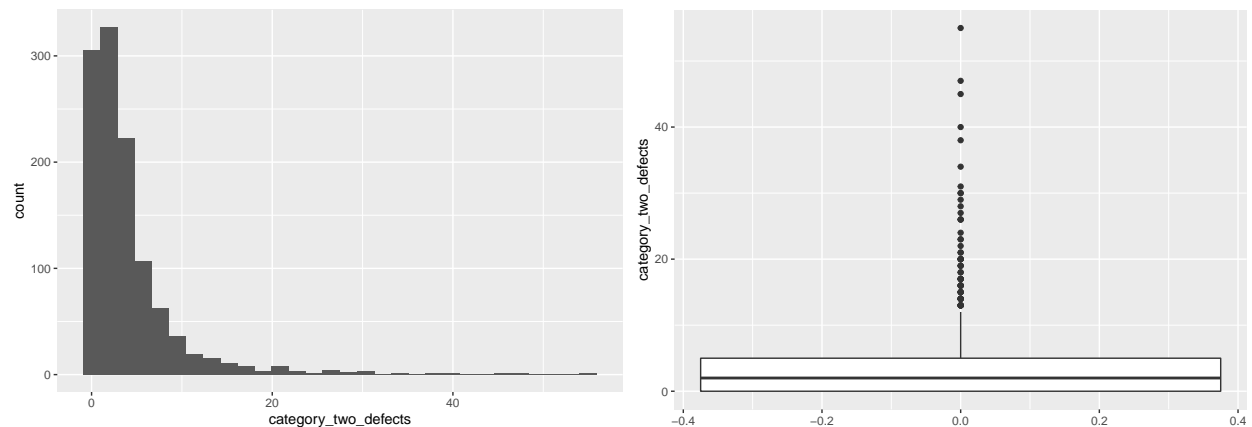


Figure 4: Histogram and boxplot for category two defects.

```
Rows: 1,145
Columns: 9
$ country_of_origin <chr> "Myanmar", "Uganda", "Ethiopia", "Mexico", "Burun~
$ aroma <dbl> 7.25, 8.33, 8.42, 7.17, 7.75, 7.92, 7.92, 7.83, 7~
$ flavor <dbl> 7.42, 7.92, 8.00, 7.08, 7.67, 7.75, 7.83, 7.67, 6~
$ acidity <dbl> 7.50, 7.92, 8.00, 7.25, 7.50, 7.75, 7.67, 7.58, 7~
$ category_two_defects <dbl> 4, 1, 7, 3, 5, 0, 1, 2, 2, 1, 0, 8, 0, 2, 0, 0, 2~
$ altitude_mean_meters <dbl> 1219.20, 1600.00, 1700.00, 1300.00, 1880.00, 1400~
$ harvested <dbl> 2015, 2013, 2014, 2012, 2012, 2014, NA, 2015, 201~
$ Qualityclass <chr> "Poor", "Good", "Good", "Poor", "Good", "Good", "~
$ defects_log <dbl> 1.6094379, 0.6931472, 2.0794415, 1.3862944, 1.791~
```

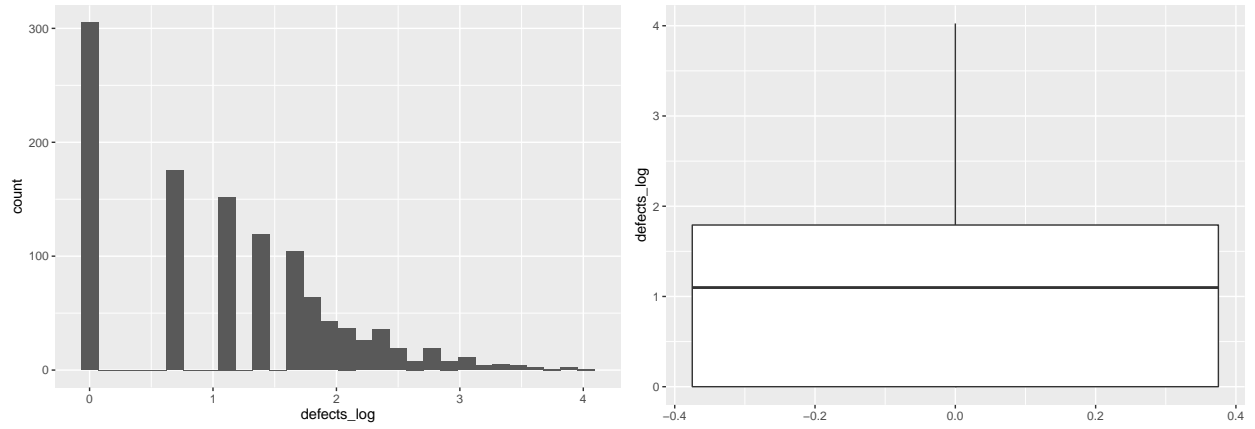


Figure 5: Histogram and boxplot for category two defects after log transformation.

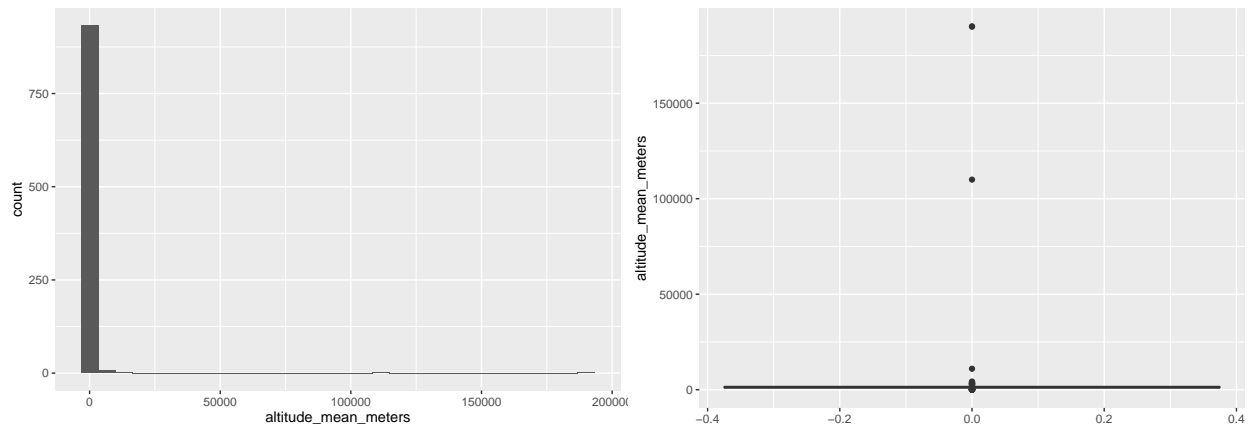


Figure 6: Histogram and boxplot for altitude.

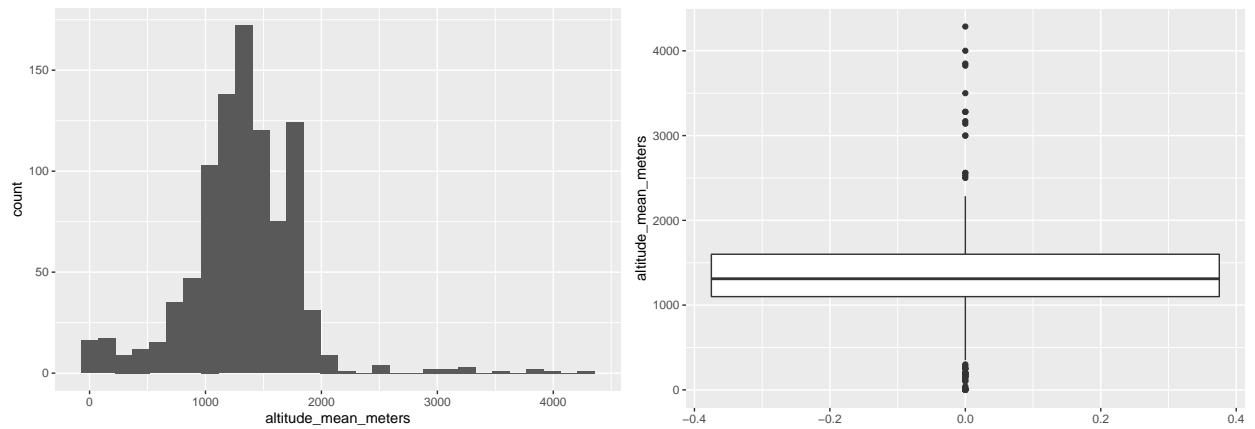


Figure 7: Histogram and boxplot for altitude after removing implausible observations.

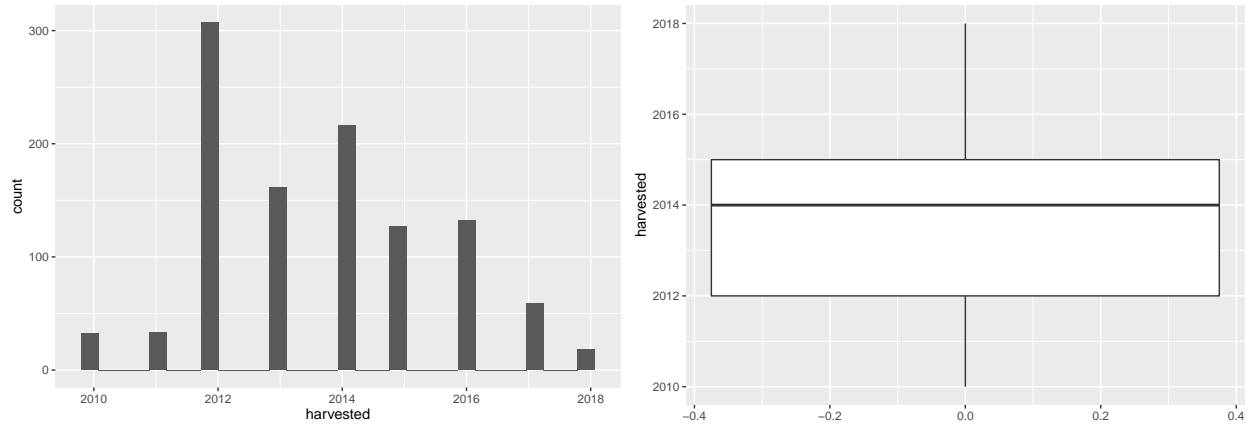
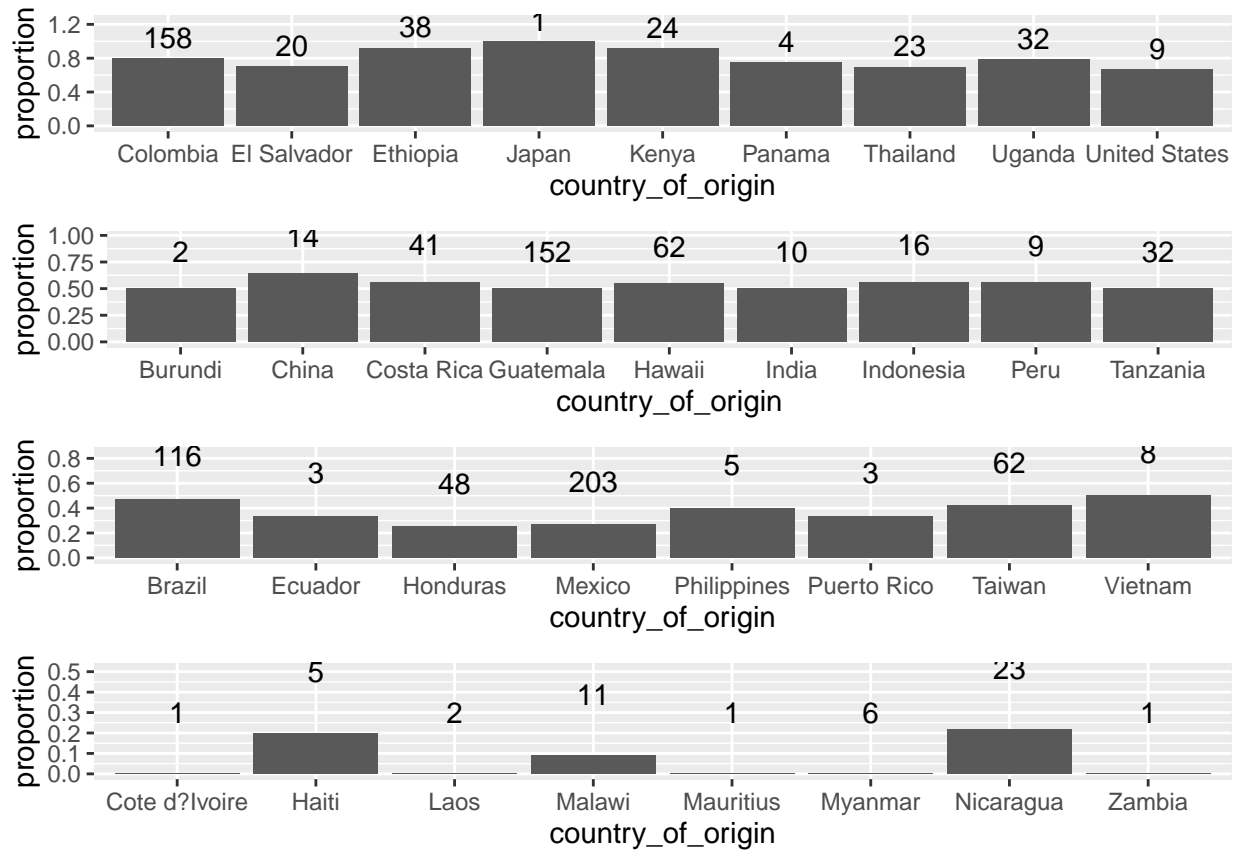


Figure 8: Histogram and boxplot for harvested.



Rows: 930

Columns: 8

```
$ country_of_origin <chr> "Myanmar", "Uganda", "Ethiopia", "Mexico", "Burundi"~
$ aroma <dbl> -1.084245709, 2.451292211, 2.745920371, -1.346137407~
$ flavor <dbl> -0.32474610, 1.21692758, 1.46359537, -1.37308420, 0.~
$ acidity <dbl> -0.1080856, 1.2368728, 1.4930554, -0.9086561, -0.108~
$ defects_log <dbl> 1.6094379, 0.6931472, 2.0794415, 1.3862944, 1.791759~
$ year <fct> 2015, 2013, 2014, 2012, 2012, 2014, 2015, 2013, 2013~
$ level <chr> "3", "3", "3", "3", "3", "3", "3", "3", "3", "3", "3"
```

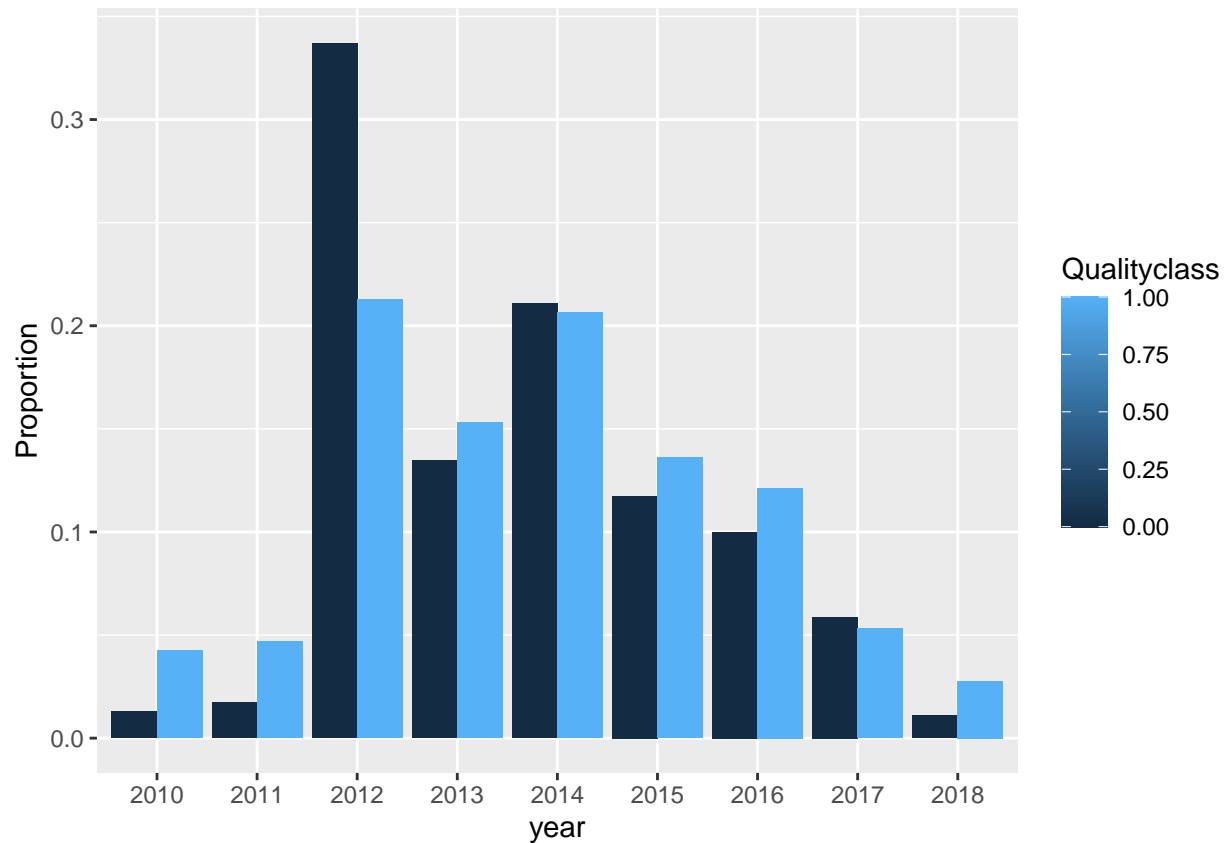
```
$ Qualityclass      <dbl> 0, 1, 1, 0, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1~
```

```
# A tibble: 9 x 2
```

```
  year      n
  <fct> <int>
1 2010      26
2 2011      30
3 2012     255
4 2013     134
5 2014     194
6 2015     118
7 2016     103
8 2017      52
9 2018      18
```

```
Qualityclass    Brazil  Burundi    China    Colombia Costa Rica Cote d'Ivoire
0  9.6% (44) 0.2% (1) 1.1% (5)  4.8% (22)  3.5% (16)    0.2% (1)
1 10.0% (47) 0.2% (1) 1.9% (9) 22.3% (105)  4.3% (20)    0.0% (0)
Ecuador El Salvador Ethiopia Guatemala  Haiti  Hawaii Honduras  India
0.2% (1)  1.1% (5) 0.0% (0) 13.3% (61) 0.9% (4) 0.0% (0) 7.4% (34) 1.1% (5)
0.2% (1)  2.8% (13) 4.9% (23) 14.0% (66) 0.2% (1) 0.2% (1) 2.6% (12) 1.1% (5)
Indonesia Kenya Laos Malawi Mauritius Mexico Myanmar
1.3% (6) 0.4% (2) 0.4% (2) 2.2% (10) 0.2% (1) 32.2% (148) 1.3% (6)
1.7% (8) 3.8% (18) 0.0% (0) 0.2% (1) 0.0% (0) 11.1% (52) 0.0% (0)
Nicaragua Panama Peru Philippines Puerto Rico Taiwan Tanzania
2.2% (10) 0.2% (1) 0.2% (1) 0.7% (3) 0.4% (2) 7.4% (34) 3.3% (15)
0.6% (3) 0.6% (3) 0.0% (0) 0.4% (2) 0.2% (1) 4.9% (23) 3.0% (14)
Thailand Uganda United States Vietnam Zambia
1.3% (6) 1.5% (7) 0.7% (3) 0.7% (3) 0.2% (1)
1.7% (8) 4.9% (23) 1.3% (6) 0.9% (4) 0.0% (0)
```

```
Qualityclass    2010    2011    2012    2013    2014    2015
0  1.3% (6) 1.7% (8) 33.7% (155) 13.5% (62) 21.1% (97) 11.7% (54)
1  4.3% (20) 4.7% (22) 21.3% (100) 15.3% (72) 20.6% (97) 13.6% (64)
2016    2017    2018
10.0% (46) 5.9% (27) 1.1% (5)
12.1% (57) 5.3% (25) 2.8% (13)
```



Formal Analysis

Build the models

Only base on the altitude

Call:

```
glm(formula = Qualityclass ~ level - 1, family = binomial(link = "logit"),
    data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.287	-1.287	1.071	1.071	1.369

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
level1	-0.43891	0.18321	-2.396	0.01659 *
level2	-0.40968	0.14513	-2.823	0.00476 **
level3	0.25508	0.08184	3.117	0.00183 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.3 on 930 degrees of freedom
 Residual deviance: 1265.4 on 927 degrees of freedom
 AIC: 1271.4

Number of Fisher Scoring iterations: 4

Base on the year of harvest

Call:

```
glm(formula = Qualityclass ~ year, family = binomial(link = "logit"),
    data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-1.7125	-1.1774	0.7244	1.1146	1.3683

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	1.2040	0.4655	2.587	0.009694	**
year2011	-0.1924	0.6222	-0.309	0.757181	
year2012	-1.6422	0.4828	-3.401	0.000671	***
year2013	-1.0544	0.4967	-2.123	0.033753	*
year2014	-1.2040	0.4871	-2.472	0.013450	*
year2015	-1.0341	0.5008	-2.065	0.038941	*
year2016	-0.9896	0.5059	-1.956	0.050466	.
year2017	-1.2809	0.5419	-2.364	0.018099	*
year2018	-0.2485	0.7026	-0.354	0.723600	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.1 on 929 degrees of freedom
 Residual deviance: 1256.0 on 921 degrees of freedom
 AIC: 1274

Number of Fisher Scoring iterations: 4

Base on the country

Call:

```
glm(formula = Qualityclass ~ country_of_origin, family = binomial(link = "logit"),
    data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.14597	-1.01655	0.00036	1.08424	2.18993

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	0.06596	0.20977	0.314	0.75320
country_of_originBurundi	-0.06596	1.42969	-0.046	0.96320
country_of_originChina	0.52183	0.59592	0.876	0.38121

country_of_originColombia	1.49696	0.31461	4.758	1.95e-06	***
country_of_originCosta Rica	0.15719	0.39561	0.397	0.69112	
country_of_originCote d'Ivoire	-16.63203	2399.54473	-0.007	0.99447	
country_of_originEcuador	-0.06596	1.42969	-0.046	0.96320	
country_of_originEl Salvador	0.88955	0.56650	1.570	0.11636	
country_of_originEthiopia	16.50011	500.33971	0.033	0.97369	
country_of_originGuatemala	0.01282	0.27486	0.047	0.96279	
country_of_originHaiti	-1.45225	1.13754	-1.277	0.20172	
country_of_originHawaii	16.50011	2399.54473	0.007	0.99451	
country_of_originHonduras	-1.10741	0.39592	-2.797	0.00516	**
country_of_originIndia	-0.06596	0.66634	-0.099	0.92115	
country_of_originIndonesia	0.22172	0.57937	0.383	0.70194	
country_of_originKenya	2.13127	0.77431	2.752	0.00591	**
country_of_originLaos	-16.63203	1696.73436	-0.010	0.99218	
country_of_originMalawi	-2.36854	1.06958	-2.214	0.02680	*
country_of_originMauritius	-16.63203	2399.54473	-0.007	0.99447	
country_of_originMexico	-1.11193	0.26456	-4.203	2.63e-05	***
country_of_originMyanmar	-16.63203	979.61005	-0.017	0.98645	
country_of_originNicaragua	-1.26993	0.69090	-1.838	0.06605	.
country_of_originPanama	1.03265	1.17360	0.880	0.37891	
country_of_originPeru	-16.63203	2399.54473	-0.007	0.99447	
country_of_originPhilippines	-0.47142	0.93666	-0.503	0.61475	
country_of_originPuerto Rico	-0.75911	1.24258	-0.611	0.54126	
country_of_originTaiwan	-0.45682	0.34190	-1.336	0.18150	
country_of_originTanzania	-0.13495	0.42673	-0.316	0.75182	
country_of_originThailand	0.22172	0.57937	0.383	0.70194	
country_of_originUganda	1.12363	0.47994	2.341	0.01922	*
country_of_originUnited States	0.62719	0.73757	0.850	0.39513	
country_of_originVietnam	0.22172	0.79205	0.280	0.77952	
country_of_originZambia	-16.63203	2399.54473	-0.007	0.99447	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.1 on 929 degrees of freedom
 Residual deviance: 1072.1 on 897 degrees of freedom
 AIC: 1138.1

Number of Fisher Scoring iterations: 15

According the result before, we choose some significant country as a class variable.

Call:

```
glm(formula = Qualityclass ~ Colombia + Mexico + Honduras + Kenya -
    1, family = binomial(link = "logit"), data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.146	-1.177	0.459	1.177	1.641

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
Colombia	1.5629	0.2345	6.666	2.64e-11 ***

Mexico	-1.0460	0.1612	-6.488	8.68e-11	***
Honduras	-1.0415	0.3358	-3.102	0.00192	**
Kenya	2.1972	0.7453	2.948	0.00320	**

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.3 on 930 degrees of freedom
Residual deviance: 1156.6 on 926 degrees of freedom
AIC: 1164.6

Number of Fisher Scoring iterations: 4

Base on the year and country

Call:

```
glm(formula = Qualityclass ~ country_of_origin + year, family = binomial(link = "logit"),
     data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.17448	-0.97437	0.00032	1.00309	2.18993

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.03468	0.59460	-0.058	0.95349
country_of_originBurundi	0.15624	1.44037	0.108	0.91362
country_of_originChina	0.77187	0.63053	1.224	0.22089
country_of_originColombia	1.84054	0.34098	5.398	6.75e-08 ***
country_of_originCosta Rica	0.49081	0.42149	1.164	0.24423
country_of_originCote d'Ivoire	-16.57149	2399.54474	-0.007	0.99449
country_of_originEcuador	0.32438	1.45807	0.222	0.82395
country_of_originEl Salvador	1.15147	0.58475	1.969	0.04893 *
country_of_originEthiopia	16.82884	497.80415	0.034	0.97303
country_of_originGuatemala	0.41515	0.30673	1.353	0.17591
country_of_originHaiti	-0.94200	1.15374	-0.816	0.41423
country_of_originHawaii	16.60075	2399.54479	0.007	0.99448
country_of_originHonduras	-0.88360	0.41906	-2.109	0.03499 *
country_of_originIndia	0.27588	0.69004	0.400	0.68930
country_of_originIndonesia	0.42228	0.60048	0.703	0.48191
country_of_originKenya	2.57473	0.79133	3.254	0.00114 **
country_of_originLaos	-16.57882	1696.72545	-0.010	0.99220
country_of_originMalawi	-1.91280	1.09277	-1.750	0.08005 .
country_of_originMauritius	-16.57149	2399.54474	-0.007	0.99449
country_of_originMexico	-0.71989	0.31440	-2.290	0.02204 *
country_of_originMyanmar	-16.52163	976.27716	-0.017	0.98650
country_of_originNicaragua	-1.11252	0.70712	-1.573	0.11565
country_of_originPanama	1.47628	1.18697	1.244	0.21360
country_of_originPeru	-16.24816	2399.54474	-0.007	0.99460
country_of_originPhilippines	-0.11413	0.95334	-0.120	0.90471
country_of_originPuerto Rico	-0.03897	1.26851	-0.031	0.97549
country_of_originTaiwan	-0.10856	0.37283	-0.291	0.77092
country_of_originTanzania	0.21667	0.45820	0.473	0.63630

country_of_originThailand	0.61483	0.60175	1.022	0.30691
country_of_originUganda	1.68023	0.51792	3.244	0.00118 **
country_of_originUnited States	1.07504	0.76568	1.404	0.16031
country_of_originVietnam	0.66336	0.81159	0.817	0.41372
country_of_originZambia	-16.17628	2399.54474	-0.007	0.99462
year2011	0.45958	0.71314	0.644	0.51928
year2012	-0.28323	0.58365	-0.485	0.62749
year2013	-0.61950	0.59127	-1.048	0.29476
year2014	-0.35511	0.58834	-0.604	0.54613
year2015	0.05473	0.59555	0.092	0.92678
year2016	0.04011	0.59731	0.067	0.94646
year2017	-0.37725	0.63786	-0.591	0.55423
year2018	0.81484	0.79630	1.023	0.30617

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.1 on 929 degrees of freedom
 Residual deviance: 1060.4 on 889 degrees of freedom
 AIC: 1142.4

Number of Fisher Scoring iterations: 15

Base on the altitude and country

Call:

```
glm(formula = Qualityclass ~ level + Colombia + Mexico + Honduras +
     Kenya, family = binomial(link = "logit"), data = coffee_final)
```

Deviance Residuals:

	Min	1Q	Median	3Q	Max
	-2.2327	-0.9800	0.4155	1.0322	1.9251

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.4838	0.1948	-2.484	0.0130 *
level2	0.4061	0.2476	1.640	0.1010
level3	0.8352	0.2144	3.896	9.79e-05 ***
Colombia	1.3248	0.2544	5.207	1.92e-07 ***
Mexico	-1.1988	0.1859	-6.448	1.13e-10 ***
Honduras	-1.3846	0.3520	-3.933	8.39e-05 ***
Kenya	2.0547	0.7551	2.721	0.0065 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.1 on 929 degrees of freedom
 Residual deviance: 1137.0 on 923 degrees of freedom
 AIC: 1151

Number of Fisher Scoring iterations: 4

Base on the 3

Call:

```
glm(formula = Qualityclass ~ level + country_of_origin + year -
    1, family = binomial(link = "logit"), data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.24878	-0.87349	0.00031	0.98739	2.12047

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
level1	-6.057e-01	6.460e-01	-0.938	0.34842
level2	6.539e-02	6.237e-01	0.105	0.91650
level3	4.660e-01	6.327e-01	0.736	0.46144
country_of_originBurundi	-3.436e-01	1.454e+00	-0.236	0.81321
country_of_originChina	4.626e-01	6.421e-01	0.721	0.47119
country_of_originColombia	1.525e+00	3.612e-01	4.223	2.42e-05 ***
country_of_originCosta Rica	2.346e-01	4.355e-01	0.539	0.59011
country_of_originCote d'Ivoire	-1.606e+01	2.400e+03	-0.007	0.99466
country_of_originEcuador	9.024e-01	1.481e+00	0.609	0.54239
country_of_originEl Salvador	7.797e-01	5.933e-01	1.314	0.18874
country_of_originEthiopia	1.639e+01	4.970e+02	0.033	0.97369
country_of_originGuatemala	-2.782e-03	3.394e-01	-0.008	0.99346
country_of_originHaiti	-7.446e-01	1.185e+00	-0.628	0.52988
country_of_originHawaii	1.717e+01	2.400e+03	0.007	0.99429
country_of_originHonduras	-1.345e+00	4.471e-01	-3.008	0.00263 **
country_of_originIndia	3.083e-01	7.105e-01	0.434	0.66438
country_of_originIndonesia	4.157e-03	6.167e-01	0.007	0.99462
country_of_originKenya	2.400e+00	8.037e-01	2.986	0.00283 **
country_of_originLaos	-1.707e+01	1.696e+03	-0.010	0.99197
country_of_originMalawi	-2.146e+00	1.097e+00	-1.957	0.05035 .
country_of_originMauritius	-1.606e+01	2.400e+03	-0.007	0.99466
country_of_originMexico	-9.546e-01	3.255e-01	-2.933	0.00336 **
country_of_originMyanmar	-1.682e+01	9.735e+02	-0.017	0.98622
country_of_originNicaragua	-1.245e+00	7.120e-01	-1.748	0.08044 .
country_of_originPanama	1.155e+00	1.192e+00	0.969	0.33234
country_of_originPeru	-1.669e+01	2.400e+03	-0.007	0.99445
country_of_originPhilippines	-2.897e-01	9.557e-01	-0.303	0.76183
country_of_originPuerto Rico	6.030e-01	1.289e+00	0.468	0.63987
country_of_originTaiwan	2.949e-01	3.980e-01	0.741	0.45863
country_of_originTanzania	-1.655e-01	4.788e-01	-0.346	0.72962
country_of_originThailand	7.166e-01	6.329e-01	1.132	0.25752
country_of_originUganda	1.292e+00	5.338e-01	2.420	0.01554 *
country_of_originUnited States	8.490e-01	7.818e-01	1.086	0.27750
country_of_originVietnam	4.664e-01	8.165e-01	0.571	0.56787
country_of_originZambia	-1.658e+01	2.400e+03	-0.007	0.99449
year2011	2.581e-01	7.296e-01	0.354	0.72350
year2012	-3.418e-01	6.032e-01	-0.567	0.57092
year2013	-6.905e-01	6.106e-01	-1.131	0.25814
year2014	-4.561e-01	6.076e-01	-0.751	0.45289
year2015	-1.422e-02	6.148e-01	-0.023	0.98154
year2016	9.710e-02	6.157e-01	0.158	0.87469
year2017	-4.201e-01	6.555e-01	-0.641	0.52156

year2018 1.284e+00 8.242e-01 1.557 0.11939

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.3 on 930 degrees of freedom
Residual deviance: 1047.4 on 887 degrees of freedom
AIC: 1133.4

Number of Fisher Scoring iterations: 15

Colombia + Mexico + Honduras + Kenya

Consider everything

Call:

```
glm(formula = Qualityclass ~ aroma + flavor + acidity + country_of_origin +  
    defects_log + level + year, family = binomial(link = "logit"),  
    data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.5914	-0.2397	0.0000	0.2843	3.5781

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.57595	1.09508	-1.439	0.15012
aroma	1.58526	0.25890	6.123	9.18e-10 ***
flavor	2.78982	0.34848	8.006	1.19e-15 ***
acidity	1.64741	0.25864	6.369	1.90e-10 ***
country_of_originBurundi	1.88240	5.12830	0.367	0.71357
country_of_originChina	0.49916	1.08844	0.459	0.64652
country_of_originColombia	1.84638	0.57358	3.219	0.00129 **
country_of_originCosta Rica	0.26961	0.76612	0.352	0.72491
country_of_originCote d'Ivoire	-12.11826	6522.63865	-0.002	0.99852
country_of_originEcuador	-1.02265	1.52999	-0.668	0.50388
country_of_originEl Salvador	0.32640	0.96977	0.337	0.73644
country_of_originEthiopia	13.49329	894.76317	0.015	0.98797
country_of_originGuatemala	-0.75268	0.57572	-1.307	0.19108
country_of_originHaiti	2.27451	2.16150	1.052	0.29267
country_of_originHawaii	4.41740	6522.63880	0.001	0.99946
country_of_originHonduras	-0.72501	0.71286	-1.017	0.30913
country_of_originIndia	-2.55120	1.07559	-2.372	0.01770 *
country_of_originIndonesia	-0.38258	1.01141	-0.378	0.70524
country_of_originKenya	0.52684	1.54516	0.341	0.73313
country_of_originLaos	-15.24675	4515.00054	-0.003	0.99731
country_of_originMalawi	-0.65398	1.30094	-0.503	0.61518
country_of_originMauritius	-11.76872	6522.63865	-0.002	0.99856
country_of_originMexico	-0.80196	0.52029	-1.541	0.12323
country_of_originMyanmar	-15.49786	2401.00369	-0.006	0.99485
country_of_originNicaragua	0.53829	1.98308	0.271	0.78605
country_of_originPanama	3.27141	1.79738	1.820	0.06874 .
country_of_originPeru	-14.50164	6522.63864	-0.002	0.99823

country_of_originPhilippines	2.89981	2.57307	1.127	0.25975
country_of_originPuerto Rico	-2.65794	1.78541	-1.489	0.13657
country_of_originTaiwan	1.18951	0.70762	1.681	0.09276 .
country_of_originTanzania	0.91717	0.75964	1.207	0.22729
country_of_originThailand	2.87480	0.99592	2.887	0.00389 **
country_of_originUganda	-1.53625	0.79415	-1.934	0.05306 .
country_of_originUnited States	0.19578	1.52935	0.128	0.89814
country_of_originVietnam	2.24627	1.15874	1.939	0.05256 .
country_of_originZambia	-13.96552	6522.63865	-0.002	0.99829
defects_log	0.33145	0.17162	1.931	0.05345 .
level2	0.52403	0.48450	1.082	0.27943
level3	1.03968	0.48225	2.156	0.03109 *
year2011	-0.22625	1.12956	-0.200	0.84125
year2012	0.03098	0.98109	0.032	0.97481
year2013	0.48471	0.98717	0.491	0.62342
year2014	-0.07904	0.99385	-0.080	0.93661
year2015	-0.14258	0.98571	-0.145	0.88499
year2016	0.78470	1.03677	0.757	0.44913
year2017	0.46753	1.03839	0.450	0.65254
year2018	2.35570	1.32235	1.781	0.07484 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
 Residual deviance: 448.42 on 883 degrees of freedom
 AIC: 542.42

Number of Fisher Scoring iterations: 17

Call:

```
glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
  Mexico + Honduras + Kenya + defects_log + level + year, family = binomial(link = "logit"),
  data = coffee_final)
```

Deviance Residuals:

	Min	1Q	Median	3Q	Max
	-4.2576	-0.2933	0.0010	0.3296	3.6482

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.3371	0.9359	-1.429	0.1531
aroma	1.3517	0.2267	5.964	2.47e-09 ***
flavor	2.3658	0.2899	8.162	3.30e-16 ***
acidity	1.4612	0.2311	6.324	2.55e-10 ***
Colombia	1.9282	0.4095	4.708	2.50e-06 ***
Mexico	-0.7003	0.3512	-1.994	0.0461 *
Honduras	-0.5767	0.5473	-1.054	0.2920
Kenya	0.8497	1.3961	0.609	0.5427
defects_log	0.3119	0.1509	2.067	0.0387 *
level2	0.4545	0.4188	1.085	0.2779
level3	0.6754	0.3769	1.792	0.0731 .
year2011	-0.1599	1.0447	-0.153	0.8783

year2012	0.1019	0.8983	0.113	0.9097
year2013	0.1358	0.8937	0.152	0.8793
year2014	0.4155	0.8995	0.462	0.6441
year2015	-0.1081	0.9090	-0.119	0.9054
year2016	0.8173	0.9402	0.869	0.3847
year2017	0.2811	0.9682	0.290	0.7716
year2018	2.0529	1.1977	1.714	0.0865 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
 Residual deviance: 493.82 on 911 degrees of freedom
 AIC: 531.82

Number of Fisher Scoring iterations: 7

Start: AIC=531.82

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
 Honduras + Kenya + defects_log + level + year

	Df	Deviance	AIC
- year	8	503.11	525.11
- Kenya	1	494.24	530.24
- Honduras	1	494.97	530.97
- level	2	497.14	531.14
<none>		493.82	531.82
- Mexico	1	497.85	533.85
- defects_log	1	498.16	534.16
- Colombia	1	520.03	556.03
- acidity	1	543.95	579.95
- aroma	1	544.44	580.44
- flavor	1	584.68	620.68

Step: AIC=525.11

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
 Honduras + Kenya + defects_log + level

	Df	Deviance	AIC
- level	2	503.99	521.99
- Kenya	1	503.79	523.79
- Honduras	1	504.15	524.15
<none>		503.11	525.11
- defects_log	1	508.43	528.43
+ year	8	493.82	531.82
- Mexico	1	511.95	531.95
- Colombia	1	530.49	550.49
- aroma	1	551.81	571.81
- acidity	1	557.40	577.40
- flavor	1	593.89	613.89

Step: AIC=521.99

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +

Honduras + Kenya + defects_log

	Df	Deviance	AIC
- Honduras	1	504.71	520.71
- Kenya	1	504.78	520.78
<none>		503.99	521.99
+ level	2	503.11	525.11
- defects_log	1	509.68	525.68
- Mexico	1	512.91	528.91
+ year	8	497.14	531.14
- Colombia	1	535.47	551.47
- aroma	1	554.81	570.81
- acidity	1	560.36	576.36
- flavor	1	593.96	609.96

Step: AIC=520.71

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
Kenya + defects_log

	Df	Deviance	AIC
- Kenya	1	505.57	519.57
<none>		504.71	520.71
+ Honduras	1	503.99	521.99
- defects_log	1	509.97	523.97
+ level	2	504.15	524.15
- Mexico	1	513.00	527.00
+ year	8	497.78	529.78
- Colombia	1	538.07	552.07
- aroma	1	556.11	570.11
- acidity	1	561.95	575.95
- flavor	1	594.88	608.88

Step: AIC=519.57

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
defects_log

	Df	Deviance	AIC
<none>		505.57	519.57
+ Kenya	1	504.71	520.71
+ Honduras	1	504.78	520.78
+ level	2	504.92	522.92
- defects_log	1	510.96	522.96
- Mexico	1	514.26	526.26
+ year	8	498.34	528.34
- Colombia	1	538.58	550.58
- aroma	1	556.46	568.46
- acidity	1	563.79	575.79
- flavor	1	597.26	609.26

Call: glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
Mexico + defects_log, family = binomial(link = "logit"),
data = coffee_final)

Coefficients:

(Intercept)	aroma	flavor	acidity	Colombia	Mexico
-0.5381	1.2882	2.3012	1.5419	1.8858	-0.8483
defects_log					
0.3276					

Degrees of Freedom: 929 Total (i.e. Null); 923 Residual
Null Deviance: 1289
Residual Deviance: 505.6 AIC: 519.6

Call:
glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
Mexico + defects_log, family = binomial(link = "logit"),
data = coffee_final)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.0930	-0.3190	0.0012	0.3521	3.5017

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-0.5381	0.1981	-2.716	0.00661	**
aroma	1.2882	0.2134	6.036	1.58e-09	***
flavor	2.3012	0.2781	8.276	< 2e-16	***
acidity	1.5419	0.2238	6.889	5.61e-12	***
Colombia	1.8858	0.3584	5.261	1.43e-07	***
Mexico	-0.8483	0.2919	-2.906	0.00366	**
defects_log	0.3276	0.1424	2.300	0.02142	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
Residual deviance: 505.57 on 923 degrees of freedom
AIC: 519.57

Number of Fisher Scoring iterations: 7

[1] 0.8924731

[1] 0.9032471

[1] 0.8811642

Base on the altitude and country

Call:
glm(formula = Qualityclass ~ level + Colombia + Mexico + Honduras +
Kenya, family = binomial(link = "logit"), data = coffee_final)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-----	----	--------	----	-----

-2.2327 -0.9800 0.4155 1.0322 1.9251

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-0.4838	0.1948	-2.484	0.0130 *
level2	0.4061	0.2476	1.640	0.1010
level3	0.8352	0.2144	3.896	9.79e-05 ***
Colombia	1.3248	0.2544	5.207	1.92e-07 ***
Mexico	-1.1988	0.1859	-6.448	1.13e-10 ***
Honduras	-1.3846	0.3520	-3.933	8.39e-05 ***
Kenya	2.0547	0.7551	2.721	0.0065 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.1 on 929 degrees of freedom
Residual deviance: 1137.0 on 923 degrees of freedom
AIC: 1151

Number of Fisher Scoring iterations: 4

Base on the 3

Call:

```
glm(formula = Qualityclass ~ level + country_of_origin + year -  
1, family = binomial(link = "logit"), data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.24878	-0.87349	0.00031	0.98739	2.12047

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
level1	-6.057e-01	6.460e-01	-0.938	0.34842
level2	6.539e-02	6.237e-01	0.105	0.91650
level3	4.660e-01	6.327e-01	0.736	0.46144
country_of_originBurundi	-3.436e-01	1.454e+00	-0.236	0.81321
country_of_originChina	4.626e-01	6.421e-01	0.721	0.47119
country_of_originColombia	1.525e+00	3.612e-01	4.223	2.42e-05 ***
country_of_originCosta Rica	2.346e-01	4.355e-01	0.539	0.59011
country_of_originCote d'Ivoire	-1.606e+01	2.400e+03	-0.007	0.99466
country_of_originEcuador	9.024e-01	1.481e+00	0.609	0.54239
country_of_originEl Salvador	7.797e-01	5.933e-01	1.314	0.18874
country_of_originEthiopia	1.639e+01	4.970e+02	0.033	0.97369
country_of_originGuatemala	-2.782e-03	3.394e-01	-0.008	0.99346
country_of_originHaiti	-7.446e-01	1.185e+00	-0.628	0.52988
country_of_originHawaii	1.717e+01	2.400e+03	0.007	0.99429
country_of_originHonduras	-1.345e+00	4.471e-01	-3.008	0.00263 **
country_of_originIndia	3.083e-01	7.105e-01	0.434	0.66438
country_of_originIndonesia	4.157e-03	6.167e-01	0.007	0.99462
country_of_originKenya	2.400e+00	8.037e-01	2.986	0.00283 **
country_of_originLaos	-1.707e+01	1.696e+03	-0.010	0.99197
country_of_originMalawi	-2.146e+00	1.097e+00	-1.957	0.05035 .

country_of_originMauritius	-1.606e+01	2.400e+03	-0.007	0.99466	
country_of_originMexico	-9.546e-01	3.255e-01	-2.933	0.00336	**
country_of_originMyanmar	-1.682e+01	9.735e+02	-0.017	0.98622	
country_of_originNicaragua	-1.245e+00	7.120e-01	-1.748	0.08044	.
country_of_originPanama	1.155e+00	1.192e+00	0.969	0.33234	
country_of_originPeru	-1.669e+01	2.400e+03	-0.007	0.99445	
country_of_originPhilippines	-2.897e-01	9.557e-01	-0.303	0.76183	
country_of_originPuerto Rico	6.030e-01	1.289e+00	0.468	0.63987	
country_of_originTaiwan	2.949e-01	3.980e-01	0.741	0.45863	
country_of_originTanzania	-1.655e-01	4.788e-01	-0.346	0.72962	
country_of_originThailand	7.166e-01	6.329e-01	1.132	0.25752	
country_of_originUganda	1.292e+00	5.338e-01	2.420	0.01554	*
country_of_originUnited States	8.490e-01	7.818e-01	1.086	0.27750	
country_of_originVietnam	4.664e-01	8.165e-01	0.571	0.56787	
country_of_originZambia	-1.658e+01	2.400e+03	-0.007	0.99449	
year2011	2.581e-01	7.296e-01	0.354	0.72350	
year2012	-3.418e-01	6.032e-01	-0.567	0.57092	
year2013	-6.905e-01	6.106e-01	-1.131	0.25814	
year2014	-4.561e-01	6.076e-01	-0.751	0.45289	
year2015	-1.422e-02	6.148e-01	-0.023	0.98154	
year2016	9.710e-02	6.157e-01	0.158	0.87469	
year2017	-4.201e-01	6.555e-01	-0.641	0.52156	
year2018	1.284e+00	8.242e-01	1.557	0.11939	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.3 on 930 degrees of freedom
 Residual deviance: 1047.4 on 887 degrees of freedom
 AIC: 1133.4

Number of Fisher Scoring iterations: 15

Colombia + Mexico + Honduras + Kenya

Consider everything

Call:

```
glm(formula = Qualityclass ~ aroma + flavor + acidity + country_of_origin +
  defects_log + level + year, family = binomial(link = "logit"),
  data = coffee_final)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.5914	-0.2397	0.0000	0.2843	3.5781

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-1.57595	1.09508	-1.439	0.15012	
aroma	1.58526	0.25890	6.123	9.18e-10	***
flavor	2.78982	0.34848	8.006	1.19e-15	***
acidity	1.64741	0.25864	6.369	1.90e-10	***
country_of_originBurundi	1.88240	5.12830	0.367	0.71357	

country_of_originChina	0.49916	1.08844	0.459	0.64652	
country_of_originColombia	1.84638	0.57358	3.219	0.00129	**
country_of_originCosta Rica	0.26961	0.76612	0.352	0.72491	
country_of_originCote d'Ivoire	-12.11826	6522.63865	-0.002	0.99852	
country_of_originEcuador	-1.02265	1.52999	-0.668	0.50388	
country_of_originEl Salvador	0.32640	0.96977	0.337	0.73644	
country_of_originEthiopia	13.49329	894.76317	0.015	0.98797	
country_of_originGuatemala	-0.75268	0.57572	-1.307	0.19108	
country_of_originHaiti	2.27451	2.16150	1.052	0.29267	
country_of_originHawaii	4.41740	6522.63880	0.001	0.99946	
country_of_originHonduras	-0.72501	0.71286	-1.017	0.30913	
country_of_originIndia	-2.55120	1.07559	-2.372	0.01770	*
country_of_originIndonesia	-0.38258	1.01141	-0.378	0.70524	
country_of_originKenya	0.52684	1.54516	0.341	0.73313	
country_of_originLaos	-15.24675	4515.00054	-0.003	0.99731	
country_of_originMalawi	-0.65398	1.30094	-0.503	0.61518	
country_of_originMauritius	-11.76872	6522.63865	-0.002	0.99856	
country_of_originMexico	-0.80196	0.52029	-1.541	0.12323	
country_of_originMyanmar	-15.49786	2401.00369	-0.006	0.99485	
country_of_originNicaragua	0.53829	1.98308	0.271	0.78605	
country_of_originPanama	3.27141	1.79738	1.820	0.06874	.
country_of_originPeru	-14.50164	6522.63864	-0.002	0.99823	
country_of_originPhilippines	2.89981	2.57307	1.127	0.25975	
country_of_originPuerto Rico	-2.65794	1.78541	-1.489	0.13657	
country_of_originTaiwan	1.18951	0.70762	1.681	0.09276	.
country_of_originTanzania	0.91717	0.75964	1.207	0.22729	
country_of_originThailand	2.87480	0.99592	2.887	0.00389	**
country_of_originUganda	-1.53625	0.79415	-1.934	0.05306	.
country_of_originUnited States	0.19578	1.52935	0.128	0.89814	
country_of_originVietnam	2.24627	1.15874	1.939	0.05256	.
country_of_originZambia	-13.96552	6522.63865	-0.002	0.99829	
defects_log	0.33145	0.17162	1.931	0.05345	.
level2	0.52403	0.48450	1.082	0.27943	
level3	1.03968	0.48225	2.156	0.03109	*
year2011	-0.22625	1.12956	-0.200	0.84125	
year2012	0.03098	0.98109	0.032	0.97481	
year2013	0.48471	0.98717	0.491	0.62342	
year2014	-0.07904	0.99385	-0.080	0.93661	
year2015	-0.14258	0.98571	-0.145	0.88499	
year2016	0.78470	1.03677	0.757	0.44913	
year2017	0.46753	1.03839	0.450	0.65254	
year2018	2.35570	1.32235	1.781	0.07484	.

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
 Residual deviance: 448.42 on 883 degrees of freedom
 AIC: 542.42

Number of Fisher Scoring iterations: 17

Call:

```
glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
     Mexico + Honduras + Kenya + defects_log + level + year, family = binomial(link = "logit"),
     data = coffee_final)
```

Deviance Residuals:

	Min	1Q	Median	3Q	Max
	-4.2576	-0.2933	0.0010	0.3296	3.6482

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-1.3371	0.9359	-1.429	0.1531
aroma	1.3517	0.2267	5.964	2.47e-09 ***
flavor	2.3658	0.2899	8.162	3.30e-16 ***
acidity	1.4612	0.2311	6.324	2.55e-10 ***
Colombia	1.9282	0.4095	4.708	2.50e-06 ***
Mexico	-0.7003	0.3512	-1.994	0.0461 *
Honduras	-0.5767	0.5473	-1.054	0.2920
Kenya	0.8497	1.3961	0.609	0.5427
defects_log	0.3119	0.1509	2.067	0.0387 *
level2	0.4545	0.4188	1.085	0.2779
level3	0.6754	0.3769	1.792	0.0731 .
year2011	-0.1599	1.0447	-0.153	0.8783
year2012	0.1019	0.8983	0.113	0.9097
year2013	0.1358	0.8937	0.152	0.8793
year2014	0.4155	0.8995	0.462	0.6441
year2015	-0.1081	0.9090	-0.119	0.9054
year2016	0.8173	0.9402	0.869	0.3847
year2017	0.2811	0.9682	0.290	0.7716
year2018	2.0529	1.1977	1.714	0.0865 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
 Residual deviance: 493.82 on 911 degrees of freedom
 AIC: 531.82

Number of Fisher Scoring iterations: 7

Start: AIC=531.82

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
 Honduras + Kenya + defects_log + level + year

	Df	Deviance	AIC
- year	8	503.11	525.11
- Kenya	1	494.24	530.24
- Honduras	1	494.97	530.97
- level	2	497.14	531.14
<none>		493.82	531.82
- Mexico	1	497.85	533.85
- defects_log	1	498.16	534.16
- Colombia	1	520.03	556.03
- acidity	1	543.95	579.95

- aroma	1	544.44	580.44
- flavor	1	584.68	620.68

Step: AIC=525.11

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
Honduras + Kenya + defects_log + level

	Df	Deviance	AIC
- level	2	503.99	521.99
- Kenya	1	503.79	523.79
- Honduras	1	504.15	524.15
<none>		503.11	525.11
- defects_log	1	508.43	528.43
+ year	8	493.82	531.82
- Mexico	1	511.95	531.95
- Colombia	1	530.49	550.49
- aroma	1	551.81	571.81
- acidity	1	557.40	577.40
- flavor	1	593.89	613.89

Step: AIC=521.99

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
Honduras + Kenya + defects_log

	Df	Deviance	AIC
- Honduras	1	504.71	520.71
- Kenya	1	504.78	520.78
<none>		503.99	521.99
+ level	2	503.11	525.11
- defects_log	1	509.68	525.68
- Mexico	1	512.91	528.91
+ year	8	497.14	531.14
- Colombia	1	535.47	551.47
- aroma	1	554.81	570.81
- acidity	1	560.36	576.36
- flavor	1	593.96	609.96

Step: AIC=520.71

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
Kenya + defects_log

	Df	Deviance	AIC
- Kenya	1	505.57	519.57
<none>		504.71	520.71
+ Honduras	1	503.99	521.99
- defects_log	1	509.97	523.97
+ level	2	504.15	524.15
- Mexico	1	513.00	527.00
+ year	8	497.78	529.78
- Colombia	1	538.07	552.07
- aroma	1	556.11	570.11
- acidity	1	561.95	575.95
- flavor	1	594.88	608.88

Step: AIC=519.57

Qualityclass ~ aroma + flavor + acidity + Colombia + Mexico +
defects_log

	Df	Deviance	AIC
<none>		505.57	519.57
+ Kenya	1	504.71	520.71
+ Honduras	1	504.78	520.78
+ level	2	504.92	522.92
- defects_log	1	510.96	522.96
- Mexico	1	514.26	526.26
+ year	8	498.34	528.34
- Colombia	1	538.58	550.58
- aroma	1	556.46	568.46
- acidity	1	563.79	575.79
- flavor	1	597.26	609.26

Call: glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
Mexico + defects_log, family = binomial(link = "logit"),
data = coffee_final)

Coefficients:

(Intercept)	aroma	flavor	acidity	Colombia	Mexico
-0.5381	1.2882	2.3012	1.5419	1.8858	-0.8483

defects_log
0.3276

Degrees of Freedom: 929 Total (i.e. Null); 923 Residual

Null Deviance: 1289

Residual Deviance: 505.6 AIC: 519.6

Call:

glm(formula = Qualityclass ~ aroma + flavor + acidity + Colombia +
Mexico + defects_log, family = binomial(link = "logit"),
data = coffee_final)

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.0930	-0.3190	0.0012	0.3521	3.5017

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)	
(Intercept)	-0.5381	0.1981	-2.716	0.00661	**
aroma	1.2882	0.2134	6.036	1.58e-09	***
flavor	2.3012	0.2781	8.276	< 2e-16	***
acidity	1.5419	0.2238	6.889	5.61e-12	***
Colombia	1.8858	0.3584	5.261	1.43e-07	***
Mexico	-0.8483	0.2919	-2.906	0.00366	**
defects_log	0.3276	0.1424	2.300	0.02142	*

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1289.15 on 929 degrees of freedom
Residual deviance: 505.57 on 923 degrees of freedom
AIC: 519.57

Number of Fisher Scoring iterations: 7

[1] 0.8924731

[1] 0.9032471

[1] 0.8811642