GIS Report - Group 18

Resume

For the final project of the GIS subject the task consisted in solving a series of 4 specific problems and 1 suggest by the group regarding each area of interest all solved using QGIS software.

Problem 1

Consisted in the determination of the vulnerable flooding zones in the river bed of Mondego through spacial analyses of the altimetry model.

For this task we started by downloading the DEM model from the suggest database, given that the DEM model is a really heavy file and was way bigger then the assigned area was used a mask to restrict it to the desired size indicated in the assignment paper , even though, it enclosed an ocean area in the top right corner that didn't make sense to include in this problem. For that reason the mask was later edited to not include that area in the corner.

In accordance to the diagrame_01 were applied a set of functions that transformed the DEM raster in a polygon with which was possible to reach the desired gds, "probl1_25385" that includ "07polygon_17_dissolved" a polygon regarding the relative zone with less17 meters in height and the associated geometric area and "12_polygon_only_risk_diss", this one regards the same exact dimensions as the previous one but with 3 polygons for different heigh parameters and the associated risk of flooding.

In this task biggest technical issue was related to polygons geometry for which we had to run them through the "Fix geometry" function.

Problem 2

For the second one the task consisted in classifying the soil use of a given polygon using google maps as the reference for the classification. The final gds needed to include at least 10 parcels without the roads and the houses inside the parcels should also be classified as "other" (SoilUseCod = 50). The task started by delimitating the given polygon and using the "Split feature" function dived it in the desired features, this polygon was created with 2 attributes "fid" and "UseCode" and later added "Nid" regarding the primary key, soil use code and owner number of identification respectively. Besides the primary key which was an AUTOGENERATE attribute the other 2 were edit by hand according to the google maps data The houses were delimitated using the function "Fill ring" with the "UseCode" = 50.

For the roads was made a new line layer with the attribute type that was related with the width of the road later was applied a buffer in accordance with the "road_width.csv".

In the end the was applied the “Difference” function to extract “Parcels_18” the final polygon.

For this task the most challenging aspect regards the roads polygons mostly because in a first approach after the polygon was fully classified was used the function “Split parts” were the roads divided a parcel which by some unknown reason invalidated the “Difference” function in that area. There were a couple of unregistered function that were applied to polygon in other to fix this problem, they weren’t specified in the diagram because they were obsolete if the “Split parts” function wasn’t applied wrongly.

Problem 3

In this task the goal was classify the cadastre polygon setting all the zones that weren’t classified in the SoilUse gds as others adding Parcels_18 from the previous problem summing in a new gds named ParcelsNew_25385 legend it, calculate each owner and soil uses area in hectares and create a new gds “Use_25385” that represents the agriculture (code A) and forest (code F) areas by the criteria set in the problem 3 requirements

We proceeded a series of vector functions, as specified in diagrame_03, to extract and classify the remaining area of the difference between gds’s “Cadastre” and “SoilUse” as other (“SoilUseCod” = 50). To correctly add all the different components that comprise gds “ParcelsNew_25385” was used the vector function Merge for all the distinct polygons. The calculation of the owners and soil use geometry areas was made by dissolving the gds “ParcelsNew_25385” accordingly and applying the mathematical expression to the new column as mentioned in diagrame_03. The last step of making gds “Use_25385” was done using the CASE conditional of the “open field calculator”

In this problem the biggest issue was related to the Nid argument in the gds “Parcels_18” mainly because they were filled randomly and later realized that there were some numbers that were used that didn’t had any name in the owners sheet.

Problem 4

In the last task the goal consisted in calculating the susceptibility of groundwater pollution associated with the soil type and and soil use also make a new gds “GwPollVulnRegion” that comprises the areas were the index of ground water susceptibility is higher then 3

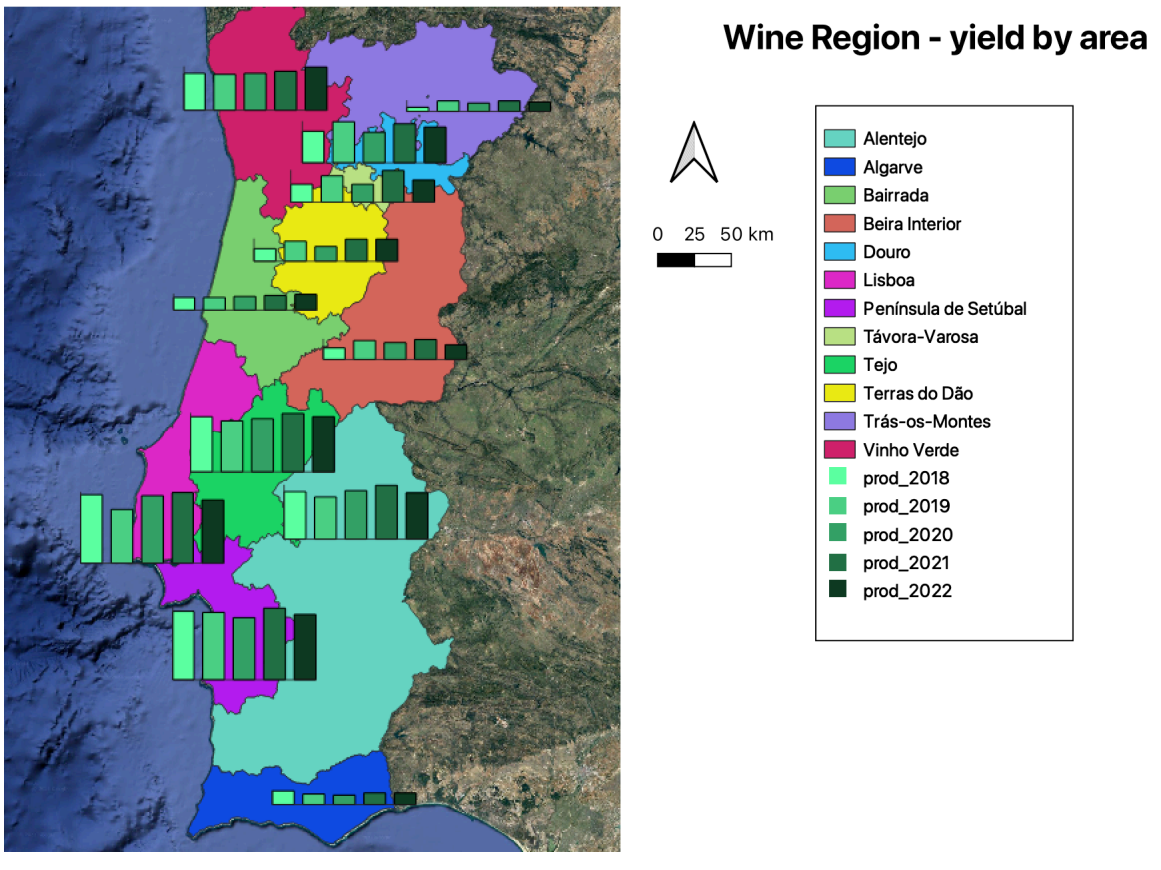
To easy the computing power needed the gds “SoilType” was dissolved by (SoilGroup) before the required vector operations. To elaborate the gds “GwPollVulnRegion” as in problem 3 the CASE conditional comes in handy making it really easy reliable to classify each risk index.

Problem 5

The general goal of this problem was to evaluate the difference between the yield of grape vines in each wine region between 2018 to 2022.

For this matter our data sets comprised of the yield and area data also a spacial layer of all the wine regions in portugal both from IVV (instituto da vinha e do vinho)

The final gds would be a polygon for which the features were the wine regions and a histogram for each feature that highlighted the yield/ production area. This way we could see the relation between the wine production in the diferente wine region and the year



With the histograms present in the this map we can quickly determine that the the variations of productivity in the different wine regions depends more because of the region then the year itself, Alentejo, Tejo and Lisbon region decrees their production in 2019 but most of the other regions got an higher productivity in some cases like douro the higher registered. The areas with the biggest productivity are in the center south of Portugal, despeite it being smaller in the north the region of Vinho Verde as an high productivity probably related to pressure associated with the exports of this wine region that propel the producers to develop their production techniques.