# Research Method

*Research Area*

The study area is defined by the national administrative borders of the Netherlands (https://www.pdok.nl/geo-services/-/article/administratieve-eenheden-inspire-geharmoniseerd-, last accessed: 04-05-2020). The Netherlands has very fragmented and diverse landscapes, which is caused by the urbanisation in the 20th century and the remodelling of waterworks to protect cities and villages against the great waterbodies (De Mulder, 2019).The current climate, following the Köppen-Geiger classification map of Beck *et al.* (2018) is a temperate climate without a dry season, but with a warm summer. These characteristics and landcover have a great influence on how fires spread

The spatial pattern of urban areas and agricultural land of the Netherlands has a fragmented landscape that has been developed throughout the second part of the 20th century. A national policy document was introduced about the on spatial planning. First was the spatial planning in the 1960s focused on spreading of regional grow poles, building housing for the growing population post-war and introducing the mobility caused by the generalization of the car. However, the changing social dynamic and the limit the urban sprawl toward peripheral area. In the 1970’s, the focus was on regional grow poles and zoning of land use was introduced. There were also buffer zones introduced to lower the urbanisation rate. In the late 1980’s, the subsidization of regional grow poles became financial unhealthy and therefore stopped. This subsidization was refocused on the cities and therefore focused on grow poles on a national level.

The final period of the national document of spatial policy reorganized spatial planning on local and regional governmental instruments such as municipalities. This caused that spatial planning became project driven instead of plan driven. However, this governmental instrument were overoptimistic and caused overzoning, which lead to a more fragmented landscape. In 2010, the spatial planning became fully regional and local, which ended the national policy of spatial planning (Janssen-Jansen, 2016).

*VIIRS dataset*

The VIIRS instrument is on the Suomi National Polar-orbiting Partnership (S-NPP) and crosses the equator ascending around 13:30 (Greenwich time) and descends around (01:30). An algorithm has been developed by Schroeder et al.(2014) to identify active fires on the earth surface at a resolution of 375 meter and increased the detection of fires by day and night. This dataset is as ASCII text file and is taken from the VNP14ML monthly dataset (<ftp://fuoco.geog.umd.edu/VIIRS/VNP14ML>, last accessed on May 2020). **NOG UITBREIDEN**

*Corine Land Cover*

The dataset that is used to extract the landcover is the Corine Land Cover (CLC) Dataset from 2012 and 2018. The CLC 2018 dataset has been developed between 2017 to 2018 and the CLC 2012 dataset between 2011-2012. The datasets have both an equal or greater 85% thematic accuracy with a minimum mapping unit of 100 meter (Büttner *et al.*, 2017). It is taken from <https://land.copernicus.eu/pan-european/corine-land-cover/clc2018?tab=download> (last accessed on May 2020).

*Overview of the methods*

Two different methods, which are visualized in flowcharts (see figure 1 **and X)** have been developed for this research. The first method is for acquiring the data from the VNL14ML, CLC rasters and administrative borders of the Netherlands. For each method, there will be given an overview what the reasoning is behind the different choices are **DIT MISSCHIEN IN THE LEIDING VAN DIT HOOFDSTUK ZETTEN**.

*Acquiring the data for the Research*

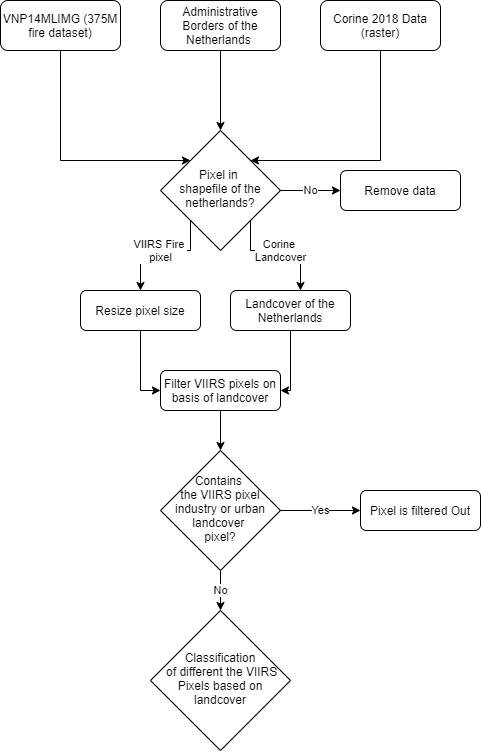


Figure Flowchart on how the data from the data sources are used and are selected. The outcome if this flowchart are a shapefile and a rasterfile containing information about the land cover and the size of the fires.

The general overview of the method for acquiring the data can be seen in figure 1. The VIIRS dataset contains information about the size of the pixel, the classification with the help of the Corine landcover, the year and the month of observation.

*VIIRS Fire pixels*

The size of the fire pixel is determined on which horizontal the pixel has been observed. The further away from the nadir how greater the bow-tie effect is, which means that the pixels toward the edge a more surface area cover. The change in angle, observation distance and curvature of the earth causes this effect. VIIRS use multiple bands to compensate his effect, however after the 960th pixel, the instrument cannot compensate the pixels which cause the pixel size of the measurements to be bigger (Cao *et al.*, 2017). **MISSCHIEN NAAR INLEDING VERPLAATSEN EN WAT UITGEBREIDER MAKEN**.

*Classification of the fire pixels*

The classification of the pixels is focused on natural fires. The agricultural and urban fires could be yearly periodical occurrent event or wrongly identified fires such as the external radiation by greenhouses or periodical burning waste **HIERBIJ NOG BRONNEN VOOR VINDEN**.

The classification of the pixels in the Corine Landcover dataset (Kosztra *et al.*, 2017) the head classes 3 (Forest and semi-natural areas) and 4 (Wetlands) are used to filter the urban, agricultural and water bodies identified fire pixels. Hereby are the bare rock class

This will be more convenient for the analysis of the data and the flexibility of the data. For the landcover datasets means that the datasets are cropped to the range of the administrative borders of the Netherlands and for the burned dataset means that the points which are in range of the borders are filtered out of the dataset.

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