# 5. Sampling:

The sampling and data collection process are essential to determine the study's quality and find the evidence. The role of theory is guiding to the selection of the samples and identifying the source of study-able research data. (Gibbs, et al., 2007) The process of collection of sampling can be challenging based on the study topic. Lab work with soil analysis demands a process of collecting samples (soil) from the targeted area. Analyzing soil’s Nitrogen, Ammonia, pH, and organic substance required different experiment work in the lab and the lab result can illustrate the soil condition of the studied landscape.

## 5.1 Location

For this study, the sample collection location was Landschaftspark Nord, Emscherstr. 71, 47137, Duisburg. Till 1985 Landschaftspark Nord was a coal and steel production area. The inactive production infrastructure is still there as a reminder of past time. In 1991 it was designed as a public park till these days. (Wikipedia, 2017) The samples (soil and water) were collected from different places in the park around a 200m2 area. As this is a park, the place has a high amount of vegetation and herbaceous grasslands. Besides that, there are some train tracks from the old-time use which contain stone, considered a stone area of the park. All these characteristics of the land can make diversity the quality of the soil and water.

## 5.2 Method

To collect the soil and water sample different tools and equipment has been used.

Tools and equipment:

* Hammer
* Iron Cylinder
* Plastic Bag
* Glass container
* Hand Trowel
* Phone camera

Every soil sample collected from the Landschaftspark Nord was leveled in a plastic bag or kept in a leveled iron cylinder. On the other hand, water samples were preserved in the glass container. While collecting the sample, collectors observe the site and note down information about the sample collection area including the characteristics of the site or how the ecosystem is involved with the place. Here is a brief table about the site information.

Table 5.1: Summary of site information:

|  |  |  |
| --- | --- | --- |
| Site information | Vegetation structure | Species |
| Height above sea level: 33m height above mean sea level. | Basic Structures |  |
| Exposition: Mostly Sunny, some sites have shadows with dance vegetation. | Community structure |  |
| Slop: Artificial slop mostly from old rail track. | Layers | Lizards |
| Soil: Varies site to site, including gravel and stones. Some site changes of soil color are noticeable. | Dynamics |  |
| Climate: warm‐moderate rain climate, mean temperature of  the warmest month below 22 °C, of the coldest month above ‐3 °C, sufficient precipitation. | Disturbance |  |
| Disturbance, anthropogenic influence: Very high |  |  |

Source: Prof. Irmgard Buder, (2022) Environmental Analysis, Impact and Risk.

Through the sample collection process, 10 soil samples and 3 water samples have been collected from 13 sites. Those samples have been used in the lab for studying.

Table 5.2: Samples

|  |  |  |  |
| --- | --- | --- | --- |
| **Water Sample** | **Latitude** | **Longitude** | **Place of taking soil sample** |
| W1 | 346077.7368 | 5705701.388 | Near Doppelkühlwerk (opp to WC) |
| W2 | 346058.7548 | 5705795.922 | Near Doppelkühlwerk |
| W3 | 345690.9976 | 5705662.818 | Next to the bridge |
|  |  |  |  |
|  |  |  |  |
| Soil Sample |  |  |  |
| S1 (soil 1) | 346044.2598 | 5705832.102 | Soil beside Doppelkühlwerk |
| S2 (soil 2, 3) | 346032.6728 | 5705826.449 | Near Sample 1 |
| S4 (soil 4) | 345868.3921 | 5705902.713 | Between iron production near Plant |
| S5 (soil 5) | 345713.0755 | 5705666.292 | Close to the narrow channel |
| S6 (soil 0) | 345274.9254 | 5705599.408 | Into the woods |
| S7 (soil 7) | 345520.1835 | 5705790.476 | Near the park |
| S8 (soil 8) | 345401.0164 | 5705448.942 | close to the rail track |
| S16 (soil 6) | 345248.5014 | 5705512.246 | Near Highway |
| S19 (soil 9) | 345416.3716 | 5705717.986 | wasteland |
| S24 (soil 10) | 345799.8416 | 5705672.706 | Between the pounds |

By using QGIS, GEO referencing, the following satellite image has been marked of the sample’s collecting sites and the data of Geological location.

Map

Description automatically generated

Figure [ ]: Sample’s Locations in Landschaftspark Nord

# Conclusion:

The collected soil samples and the water samples were examined in the lab to understand the quality of the soil and the water. As soil and water contain so many different kinds of particles and the goal of the experiment was to find out them. Through the lab experiment, the result shows the concentration of ammonium, nitrate, PH, and organic matter in the soil and the water, the key ingredient which has been examined in the laboratory, resulting in various values because of the sampling collection sites. As Landschaftspark Nord is a place where coal and iron processing factory was situated a few decades ago, it has an influence on the soil quality in this area. From the research output, it has been determined, that the higher differences among some values from samples, is resulting because of the land history. In some samples, the pH values are higher than in the other samples But the range of the value is between 6.5 to 7.5 for all the samples. The lab analysis results are the same for the water. While for Ammoniam the value differences are really high for different samples. Ammonium concentration is very low in one soil (soil 2, soil 9) sample compared to other soil samples. One water sample (Water sample 3) also results from the same with very low amount of ammonium in it. The lab experiments also find out the concentration of Nitrate in the soil and the water. in the observation, it shows the Nitrate concentration is mostly high in most of the soil and the water. As the organic matter also examined in the experiment, to find out the concentration of organic matter in the soil. Lab experiment results in a very diversity of organic matter presence in the sample. I'm on the samples four results with more than one percentage of organic matter in the soil while 2 samples contain a very low amount of organic matter, close to 0.05%. Over the time the organic matter decomposed we need the soil and it's changes the concentration of different elements percentage in the soil. Temperature moisture and aeration status influence in the process of decomposing of organic matter in the soil. (Robertson & Paul, 2000) Landschaftspark Nord is a place where the vegetation's presence is different from one place to another which affects the difference in the results of lab tests. Through this protocol, the collected data from the lab experiment has been observed and explained theoretically. As the soil and water quality assessment has been an important issue since soil contains high variability in property and function. Understanding the properties in the soil provide evidence of the inter-relationship between land use and human health. (Zornoza, et al., 2015) The lab experiment result’s data is the source of understanding the soil and the water quality and the scope of studying more to find out new findings.

# References

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