

Eco-hydrology observation Cikapundung riverbank, Indonesia

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Abstract

The following protocols is submitted as part of the Cikapundung Research 2017, as can be divided in to 3 submissions:

1. Identifying landuse and calculating its alteration in time
2. Vegetation and zoobentos observation
3. Water sampling

OSF folder will be made following this protocols.

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Guidelines

The guidelines will be divided to:

1. landuse observation
2. vegetation observation and sampling technique
3. water quality observation and sampling technique

Before start

Reminders:

1. make sure to know the route to the safest part of riverbank. Because some locations feature high

cliff and difficult sampling position due to near-river housings.

2. make sure to check the equipment conditions: bateries, buttons, cables, probes etc.

3. make sure to take notes of the situation and weather in time of sampling.

Softwares: Fragstat, Envi, ArcGIS

Protocol

Land cover map preparation

Step 1.

Create an on-screen Cikapundung polyline vector which is digitised based on Google Earth base map with ArcMap 10.4.1.

Land cover map preparation

Step 2.

Estimate land cover in the Cikapundung River riparian zone by providing buffer zones as far as 100 m, 300 m, and 500 m from the river body from upstream to downstream

Land cover map preparation

Step 3.

Classify the land cover using Google Earth downloaded on November 15, 2016. The classification of land cover is divided into nine classes: forests, shrubs and bushes, fields, fields, grasslands, constructed land, industrial buildings, and water bodies.

Land cover map preparation

Step 4.

Divide the observation in the map into segments. Each segment is 3.6 km in length. Then visualise the results in to histograms.

Land cover map analysis

Step 5.

NDVI analysis: Transform vegetation index to Near-Infrared and Visible Red band ratio. The result of the NDVI calculation will produce a band with a range of values from -1 to +1. Very little green vegetation will produce a value very close to zero (0). Conversely, the presence of tightly green vegetation will result in a value close to +1.

Land cover map analysis

Step 6.

Calculate of Kappa Accuracy Value: Accuracy value calculation is necessary to compare the accuracy of digital classification results with the fact of land cover in the field. Cohen's Kappa or so-called Kappa is used in the calculation of precision values in this study because it uses the same formula for both observers (digital classification and ground check in the field) but may have different distributions for the same rating category (Kirilenko & Stepchenkova, 2016). The error matrix model, as in Table 3.1, is used to derive preliminary data from the predictive value of accuracy.

Land cover map analysis

Step 7.

Calculate Landscape Metrics: Landscape metrics measures the spatial structure associated with landscape composition and configuration

Vegetation observation

Step 8.

Set observation area: each area is 20 m x 5 m (parallel to the length of the river).

Vegetation observation

Step 9.

Observe the vegetation in each observation area: trees with diameters ≥ 10 cm, trees with diameter <10 cm, and shrubs.

Measure edaphic factors

Step 10.

Measure edaphic factors: pH, organic content, mineral content and bulk density.

Tools: portable soil tester and auger and core sampler.

Soil sampling:

- **How to sample the soil to determine the value of the weight of the contents using the core sampler (rings).** The ground surface is cleaned first from grass and litter. Core sampler placed on the ground. Made a circle with the same centre with the core sampler and his fingers twice the radius of the core sampler. In the circle is made a hole around the core sampler as deep as 10 cm, so that when the core sampler is inserted easily pressed into the ground. The core sampler is pressed carefully and remains in a vertical position. When the ground is hard enough, the core sampler is hit slowly. If the core sampler has entered all the ground, the ground beneath the core sampler is cut with a shovel or knife. The ground is levelled at the mouth of the core sampler with a thin blade or nylon thread. This intact piece of soil kept in a box is maintained so that it is not destroyed for further processing in the laboratory. Soil trailing was immediately weighed with fresh analytical scales (accuracy of 0.01 g). The trailer was dried in the oven at 105°C for 24 hours and weighed a constant dry weight.

Lab analysis:

- Calculation of organic content and soil minerals is done by using an auger to take the soil layer on horizon A with 10 cm deep. Taken approximately 10 grammes of soil and put in a sealed container known to its weight. Using the scales, weighed to form a fresh weight. In the laboratory, soil samples are fed into an oven of 105°C to a constant weight. Let it cool for a while and weigh the dry weight of the soil. Taken extracts of dry soil 5 grammes of dry soil and then put into a dry porcelain that has been known to weigh. The spraying process can be done with a high-temperature furnace or furnace (450OC) for 4 hours. After that, the sample was cooled in the desiccator and weighed the soil weight of the soil.

Water quality observation and sampling

Step 11.

Will be added

Water quality observation and sampling

Step 12.

Warnings

1. always mind the weather forecast for sudden floods in the river
2. always keep electronic equipments safe
3. bring some plastic seal wrap to keep non-water resistant tools