	economic activities can increase by reducing resource use, degradation and pollution along the whole life cycle.
Opportunities for participatory data collection	
Additional information	
References	Wu, F. F., and Xu Wang. "Eutrophication evaluation based on set pair analysis of Baiyangdian Lake, North China." Procedia Environmental Sciences 13 (2012): 1030-1036.

4.46 pH of NBS effluents

Project Name: UNaLab (Grant Agreement no. 730052) and PHUSICOS (Grant Agreement no. 776681)

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pH of the NBS effluents	**Water Management**
Description and justification	Water quality can profoundly impact both aquatic and terrestrial ecosystems. Changes to the quality of water may occur due to many different factors, including human activities. It is therefore important to monitor water quality in environments likely to be affected by anthropogenic activity, or in particularly sensitive aquatic ecosystems. Basic water quality parameters include pH, temperature, electrical conductivity (EC), dissolved oxygen (DO) content and flow rate.
Definition	A measure of the relative acidity or alkalinity of a solution (0-14 pH units). The pH of a sample of water is a measure of the concentration of hydrogen ions (-log[H+]).
Strengths and weaknesses	+ An easy and straightforward assessment + Can be automated to ensure continuous data collection

	+ The measuring equipment is inexpensive - Determination using colorimetric approach may be hindered for the individuals suffering from colour blindness
Measurement procedure and tool	The pH of a sample of water is a measure of the concentration of hydrogen ions. If free H+ are more it is expressed acidic (i.e., pH < 7), while more OH- ions is expressed as alkaline (i.e., pH > 7). At higher pH, there are fewer free hydrogen ions, and a change of one pH unit reflects a tenfold change in the concentrations of the hydrogen ion. A pH of 7 is considered to be neutral. Substances with pH of less than 7 are acidic; substances with pH greater than 7 are basic. The pH of water determines the solubility (amount that can be dissolved in the water) and biological availability (amount that can be utilized by aquatic life) of chemical constituents such as nutrients (phosphorus, nitrogen, and carbon) and heavy metals (lead, copper, cadmium, etc.). For example, in addition to affecting how much and what form of phosphorus is most abundant in the water, pH may also determine whether aquatic life can use it. In the case of heavy metals, the degree to which they are soluble determines their toxicity. Metals tend to be more toxic at lower pH because they are more soluble. The pH is considered a 'master variable' as the pH, together with oxidative-reductive potential, determines the chemical speciation, behaviour and fate of (bio)chemical compounds in the environment. The pH range of natural waters varies from ca. 4.5 in peat-influenced waters to as high as 10.0 in systems influenced by intense algal photosynthetic activity. The typical pH range of natural waters is 6.5-8.0. Measuring of the pH is simple and is usually done using either a colorimetric method (visual or electronic) or electronic meters. Steps in the determination of pH include: • Checking the equipment. Some of the following equipment should be used: o pH colorimeter field kit o pH meter with built-in temperature sensor, or o colorimeter with reagents • Measuring the pH values o In the colorimetric method (both visual and electronic), indicators that change colour according to the pH of the solution are used. With colorimetric kits, chemical or two (reagents) are added to the water sample, and the resulting colour is

	compared to the colour standards of known pH values o With the calibrated pH meter, the electrode is placed in the water and the pH is recorded The recommended method of pH measurement is electrometry/use of a pH electrode.
Scale of measurement	Plot scale
Data source	
Required data	pH measurement data
Data input type	Quantitative
Data collection frequency	Daily (using automated measurements) or weekly
Level of expertise required	Low to moderate
Synergies with other indicators	Synergies with the other water quality indicators in the *Water management* indicator group
Connection with SDGs	SDG 13 Climate action, SDG 14 Life below water
Opportunities for participatory data collection	Participatory data collection is possible under supervision
Additional information	
References	A number of standard methodologies for water testing are available from, e.g., the International Organization for Standardization (ISO; ISO 10523:2008 Water quality — Determination of pH), American Public Health Association (APHA), the European Environment Agency (EEA), and others.