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GoMakeADifference Project

WETLAND

How do you think you made a difference? What you have achieved, what you are proud of?

I believe I made a difference:

Savings in water costs, achieving the reuse of gray water from the industry room, the kitchen and the chemistry laboratory for use in the vegetable garden.

Raise awareness in the community about the importance of good water consumption and the value of this resource.

Help a school that lacks financial resources.

Reusing and saving between 16,000 (sixteen thousand) and 20,000 (twenty thousand) liters of water per month. (between 192,000 and 240,000 per year).

Lasting successes of the project:

Ensure that the school, which is located in a desert area, which shares a building and spaces with the primary school and which does not have the amount of water necessary for the garden, can continue with it, by reusing gray water.

Through this project, students can carry out their professional internships at the institution, obtaining experience for future professional and home internships.

The implementation of the project with good quality materials, which can be supported by the school through the curricular spaces of the technical area.

The direct observation of the process for the investigation, throwing statistical data for the continuity or revision and/or reorganization of the wetland.

Raise awareness in the community about the importance of conscious consumption of water and the value of this resource.

Economic savings for the school of expenses in water and use of septic tank.

The project made a difference to the people I wanted to help, it had an impact on them.

The project made a difference for the students, families and the entire educational community, since seeing the process of reusing water, awareness was raised and it was possible to observe that it is a viable project to be carried out at home and also professionally.

Savings in water costs for the orchard, since the water from the industry room, the kitchen and the chemistry laboratory is reused.

Help a school that lacks financial resources.

The project has made a difference for me and the project team:

Consultation of other communities for the implementation of the project. Acquisition of experience to be able to generate more positive changes.

Where was the money spent?

The purchase of materials was carried out in SMEs (small and medium-sized enterprises) in the area, so they also benefited from the project. All materials used.

What lessons have you learned from the project?

Teamwork.

plumbing activities.

A big difference can be made with effort, motivation and teamwork.

What I would do differently if I ran the project again...

Extension of the schedule to have more time for its implementation.

Regular meetings for decision making.

Convene the entire educational community, not just the team and students of the curricular spaces.

How this project works:

Through this process the water is enabled for the irrigation of the garden.

The wetland consists of a basin that must have a depth of 80 cm 1m by 2m wide and covered length, i.e. a coated bottom to prevent the incoming water from being susceptible to contamination of the water table, in our case we use a black nylon of 200 Microns, ideally 400 microns.

The water leaving the wetland, which will act as a biological biofilter, will enter by concentration gradient to a 200-liter bilayer tank that will act as a settling filter for the organic matter that may pass from one system to another, then it will pass to another tank that will also act by settling. Then, using a pump, it is taken to the reservoir which is another tank of more liters and the water is stored to be used for irrigation.

The wastewater will come from the industrial room, the school kitchen and the chemistry laboratory. A pipe will be installed with a slope so that the liquids will drain down the slope without any energy cost.

In this case there are three types of physical filters: gravel, pumice and aquatic plants. This multi-layered backfill will function as a gravity filter.

This design is intended to have a system with minimal maintenance and energy consumption. The system of plants, animals, microorganisms, support and water flows will develop until it is self-sustaining. The system will make maximum use of the energy potential of the streams as natural input to the system as well as solar energy to carry out the process.

Pumice as a filter in the water treatment process is used for the problem of turbidity in wastewater, it acts in the retention of total suspended solids. It has removal treatment efficiency, improving water quality significantly.

These wetlands containing gravel or coarse sand, receive intermittent loads from the surface. The intermittent application of wastewater and vertical drainage in the bed allow aerobic reactions to occur rapidly.

Solid wastes, if not removed, can accumulate and release toxic gases and decompose the water by anaerobic bacteria, and these can reach the plant roots, preventing the absorption of nutrients, thus allowing recirculation to accumulate and remove them.

Plants are the main entry point of radiant ("solar") energy into the ecosystem, allowing the subsistence of different biological forms that depend on the organic matter formed in their tissues by photosynthesis. Aquatic plants are the trigger of life in wetlands, since they not only serve as habitat for communities of crustaceans, insects and aquatic worms, but also play a role in the feeding and shelter of fish and birds. Emergent plants capable of rooting in waterlogged soils, with a submerged and an aerial part, known as halophytes, have tissues called aeriferous cavities capable of transporting and storing oxygen from the stems to their roots and rhizomes. The oxygen they transport is produced during photosynthesis and is used in the aerobic mineralization of organic matter by heterotrophic biofilm-forming microorganisms, which grow on the submerged part of the plant. It allows the establishment of a kind of symbiosis between them, in which the plant provides oxygen to the microorganisms and the plant takes advantage of some products resulting from the metabolism of the microorganisms as supplies.

Plants absorb nutrients and release or lose small amounts during the growing season, but release large amounts when they decay or die. It is therefore important to collect them, before the plant decays or dies, to remove excess nutrients from the water, as well as to conserve the oxygen level.

On this water, water quality tests should be done for the use of the orchard, physical, chemical or biological parameters can be taken into account in the real situation.

- PHYSICAL PARAMETERS

They are not absolute indexes of contamination, so in each case the deviation from the norm should be measured. The most important physical parameters are:

Transparency, Temperature, Turbidity, Color, Odor, Taste, Temperature, Electrical conductivity, pH.

- BIOLOGICAL PARAMETERS

Refers to the presence of pathogenic microorganisms of different types: bacteria, viruses, protozoa and other transmitting organisms. A good index to measure the healthiness of water, as far as these microorganisms are concerned, is the number of coliform bacteria present in the water.

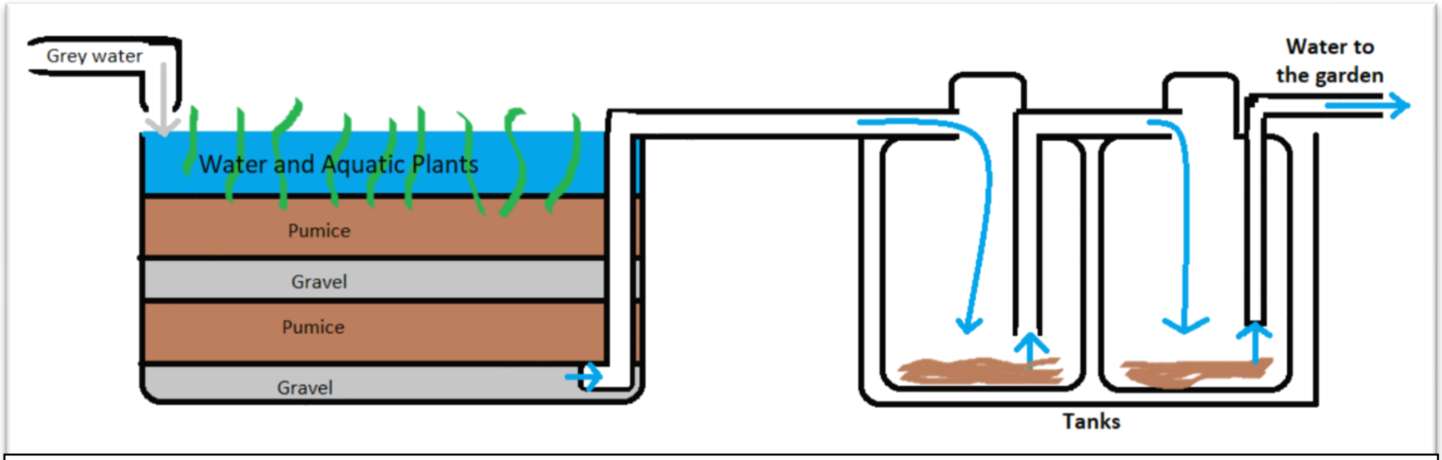
- CHEMICAL PARAMETERS

These are the most important in defining water quality. If the water under study has not received urban or industrial discharges, the survey should include the determination of the following parameters:

Most important ions (bicarbonates, chlorides, sulfates, calcium, magnesium and sodium).

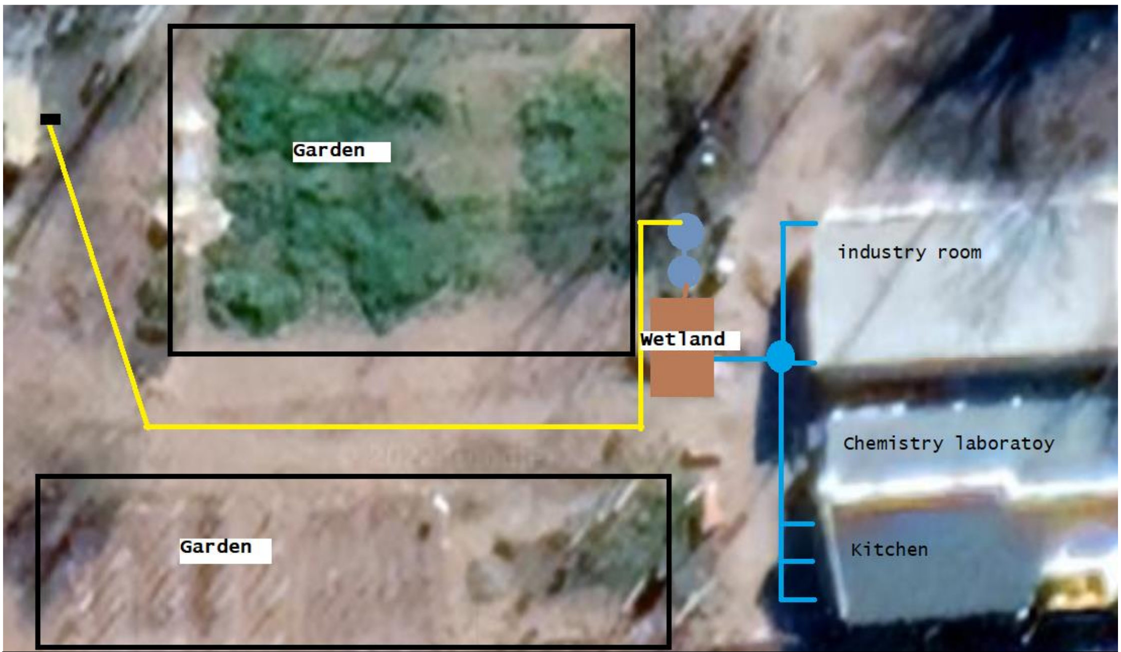
Dissolved oxygen, biochemical oxygen demand, organic carbon.

The natural factors that influence the chemical composition of the water, and the amount, location and type of urban settlements, industries and the presence of agricultural activities must be taken into account.



Wetland map

Satellite photo of the school



Plan of the water system, the wetland and connection with the irrigation

People from the school who have benefited

Finished wetland

Work team

Teachers part of the project