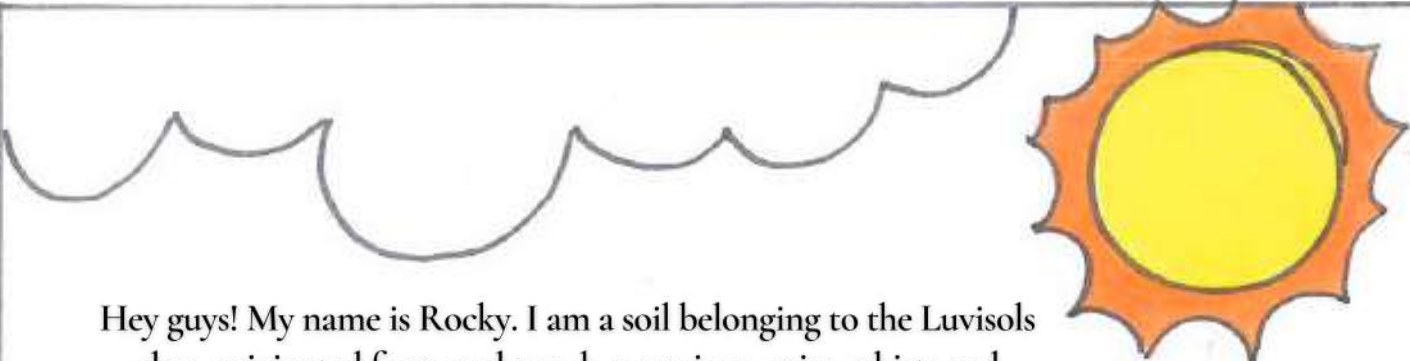


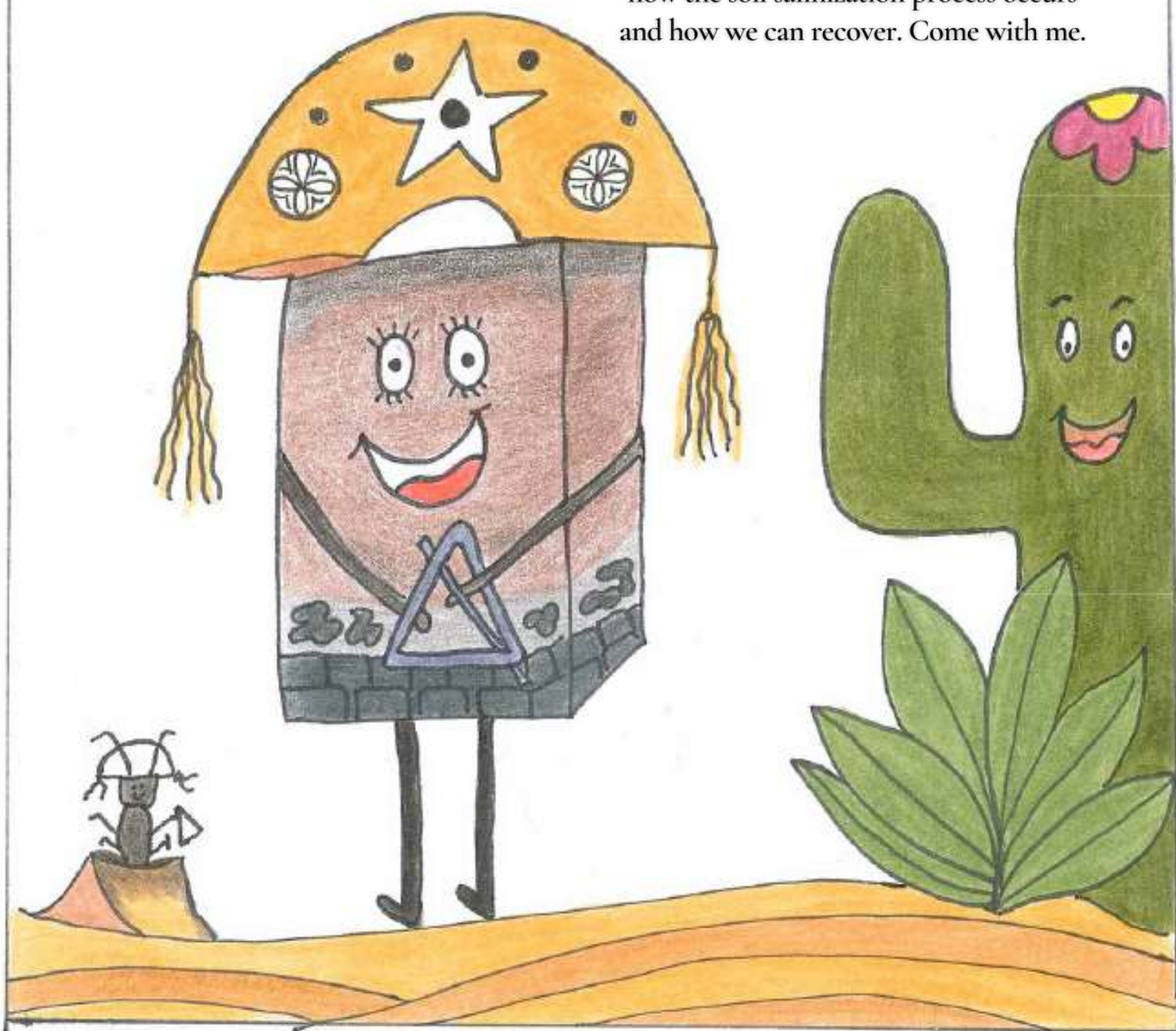
The  
History of  
**Rocky**  
The Soil

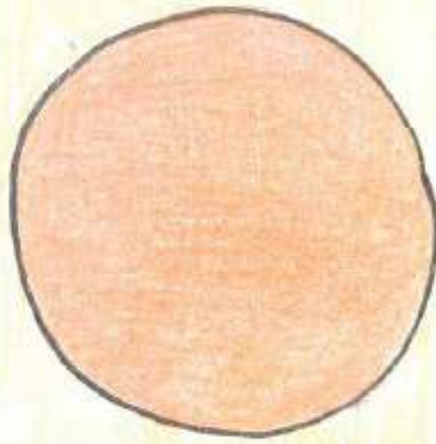


Hey guys! My name is Rocky. I am a soil belonging to the Luvisols class, originated from rocks such as gneisses, mica schists and limestones. Soils like me occupy more than 80% of northeastern Brazil, where I live.

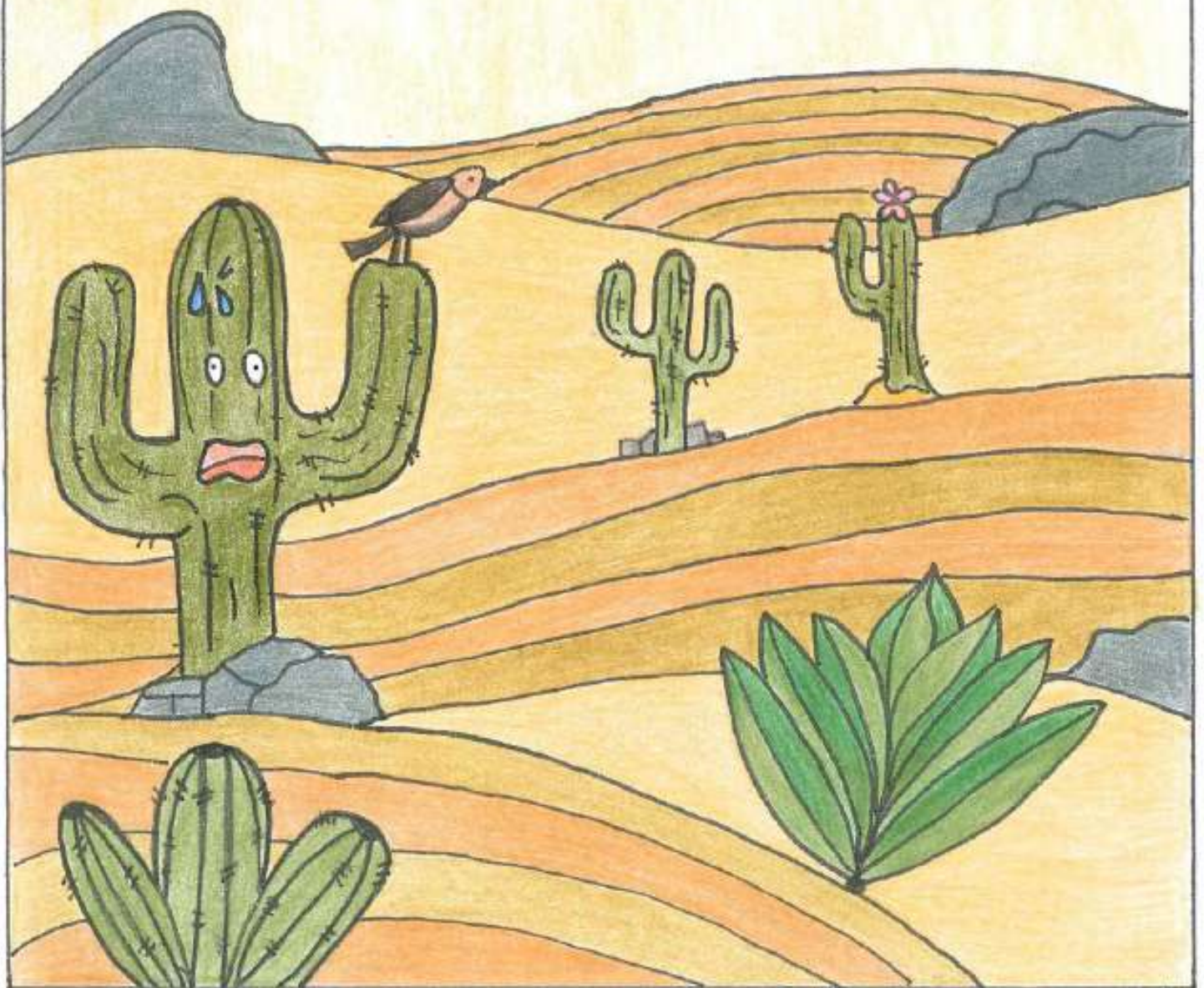
The soils here in the Northeast undergo a degradation process called Salinization, when the levels of salts such as Sodium, Chlorine, Calcium and Magnesium are too high, causing problems with clogging of pores and making the soils poor. Human beings are overexploiting my resources and mishandling me and my siblings.

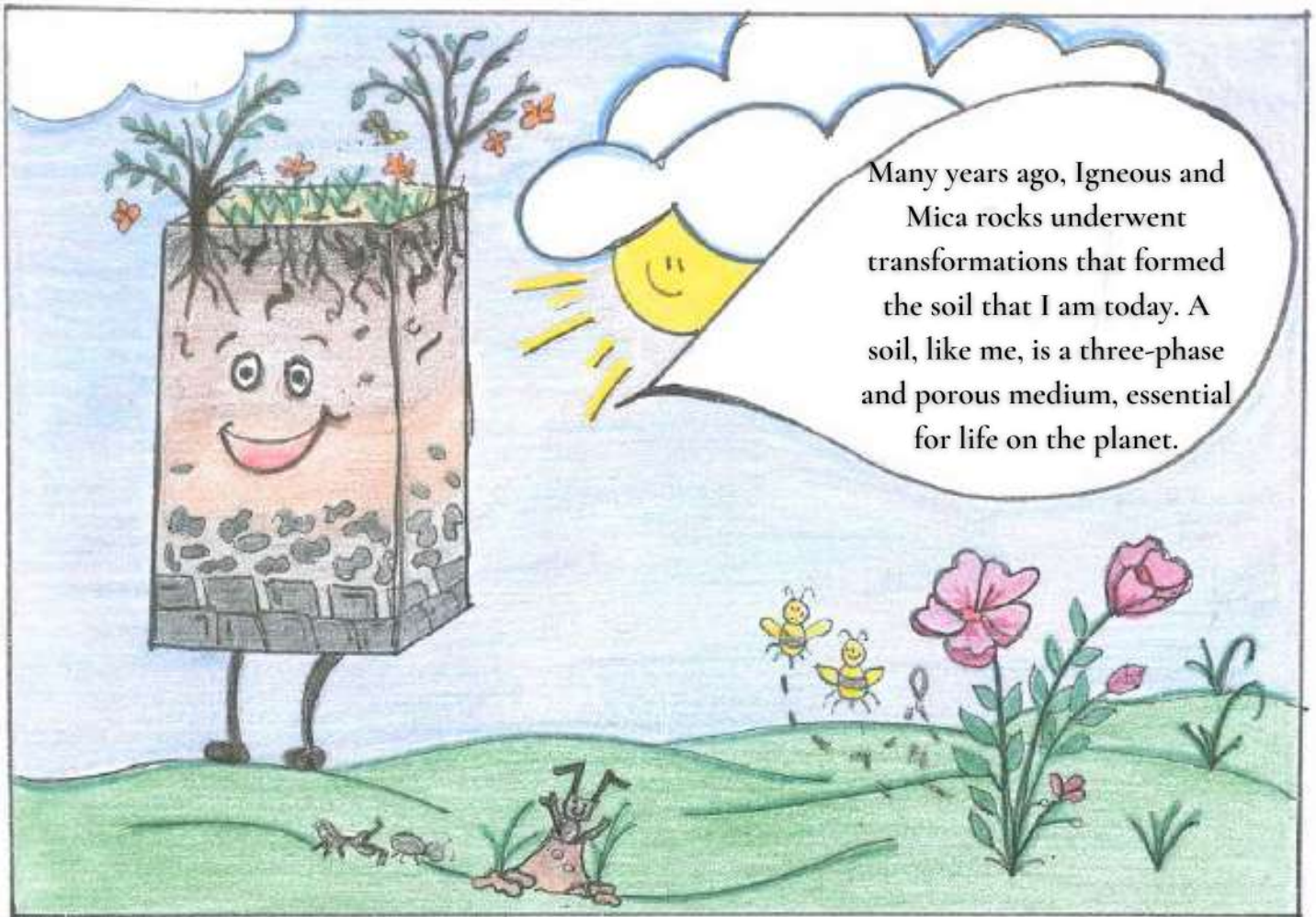
I will explain to you a little of my history, how the soil salinization process occurs and how we can recover. Come with me.





I live in a region here in Brazil, classified as semi-arid, where there is a predominance of poorly developed soils. Here, rainfall is scarce and it is hot all year round, with average temperatures higher than 25°C.





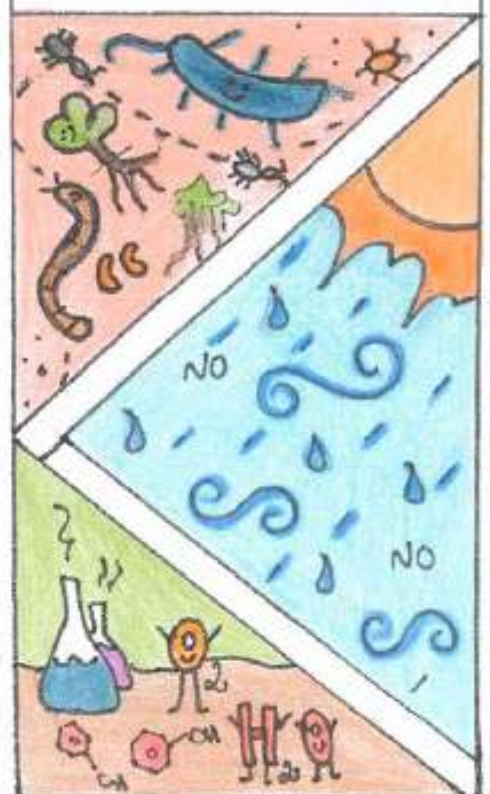
The transformations are called weathering, and they occur slowly over the years.

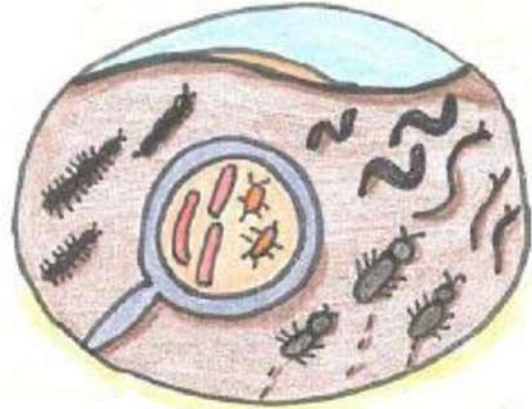


I was just a tiny rock that with variations in temperature, rain and microorganisms I was transformed.

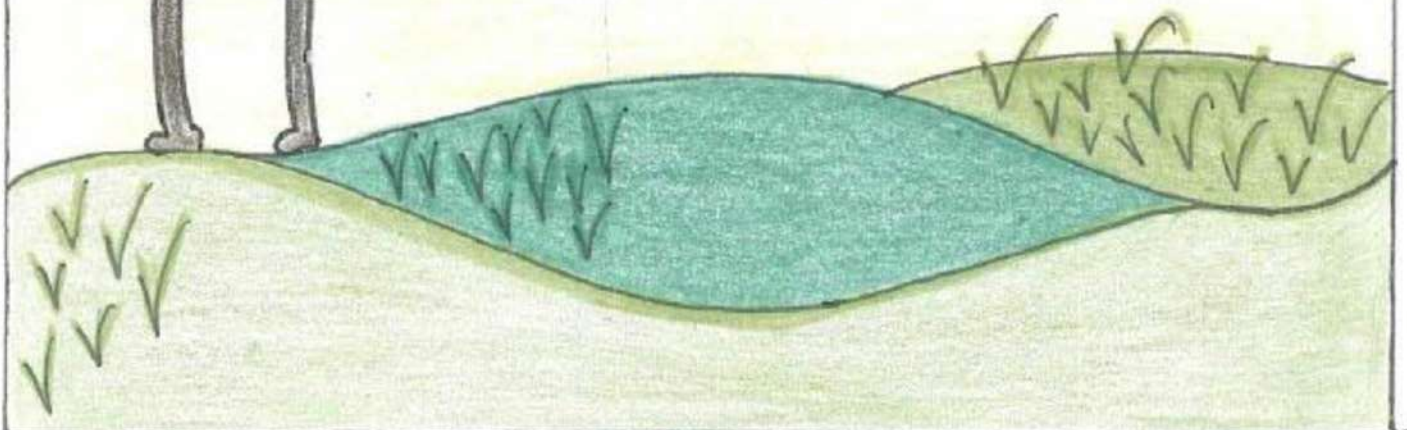
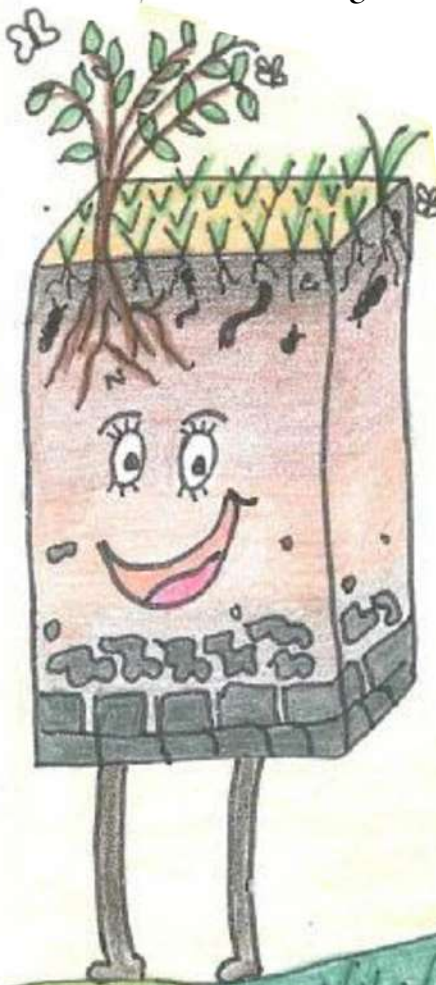
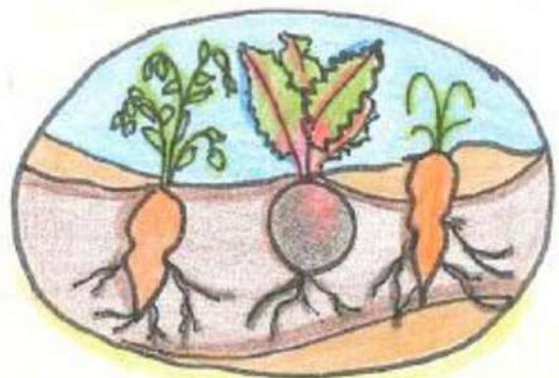


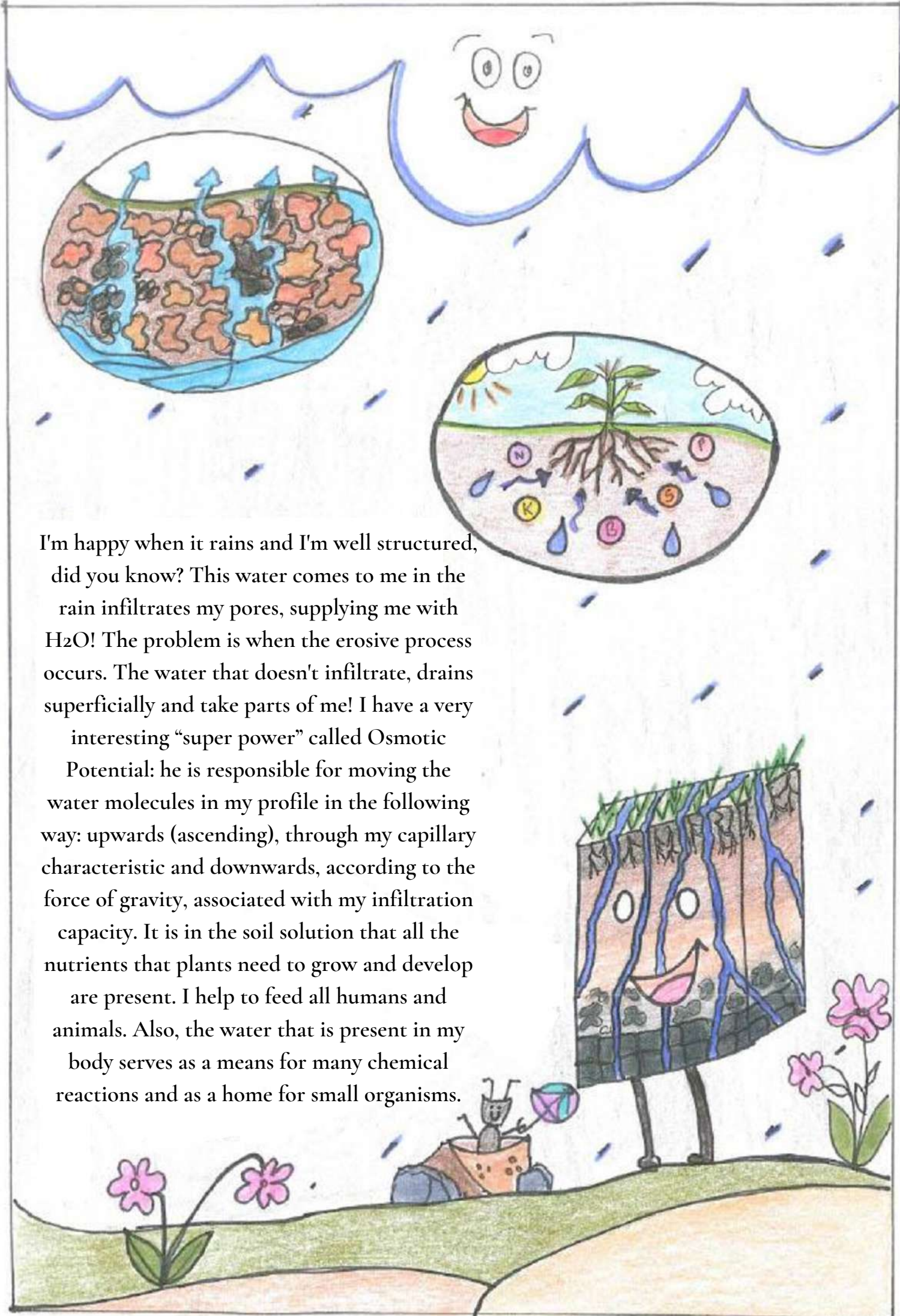
This weathering can be biological, physical or chemical.





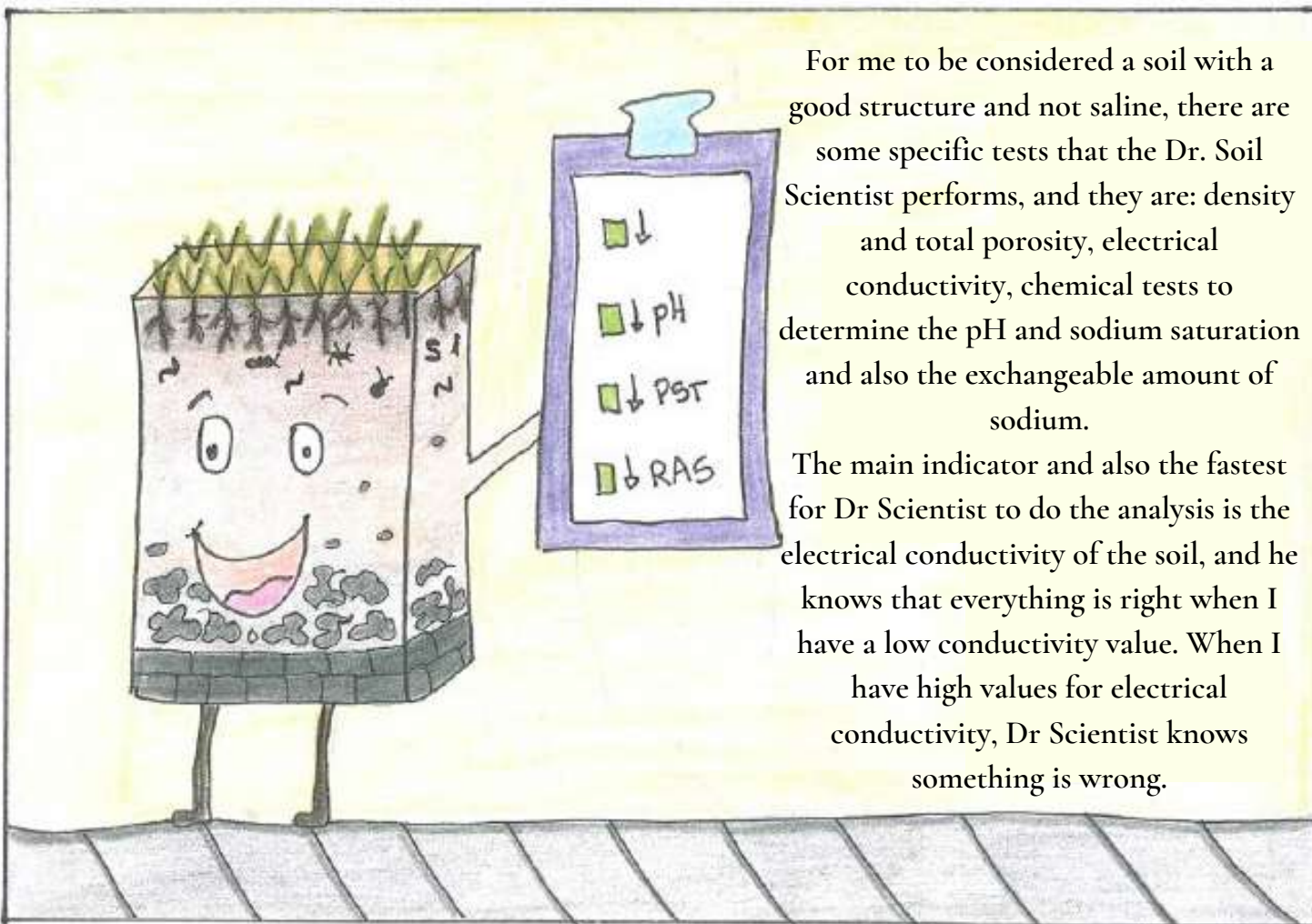
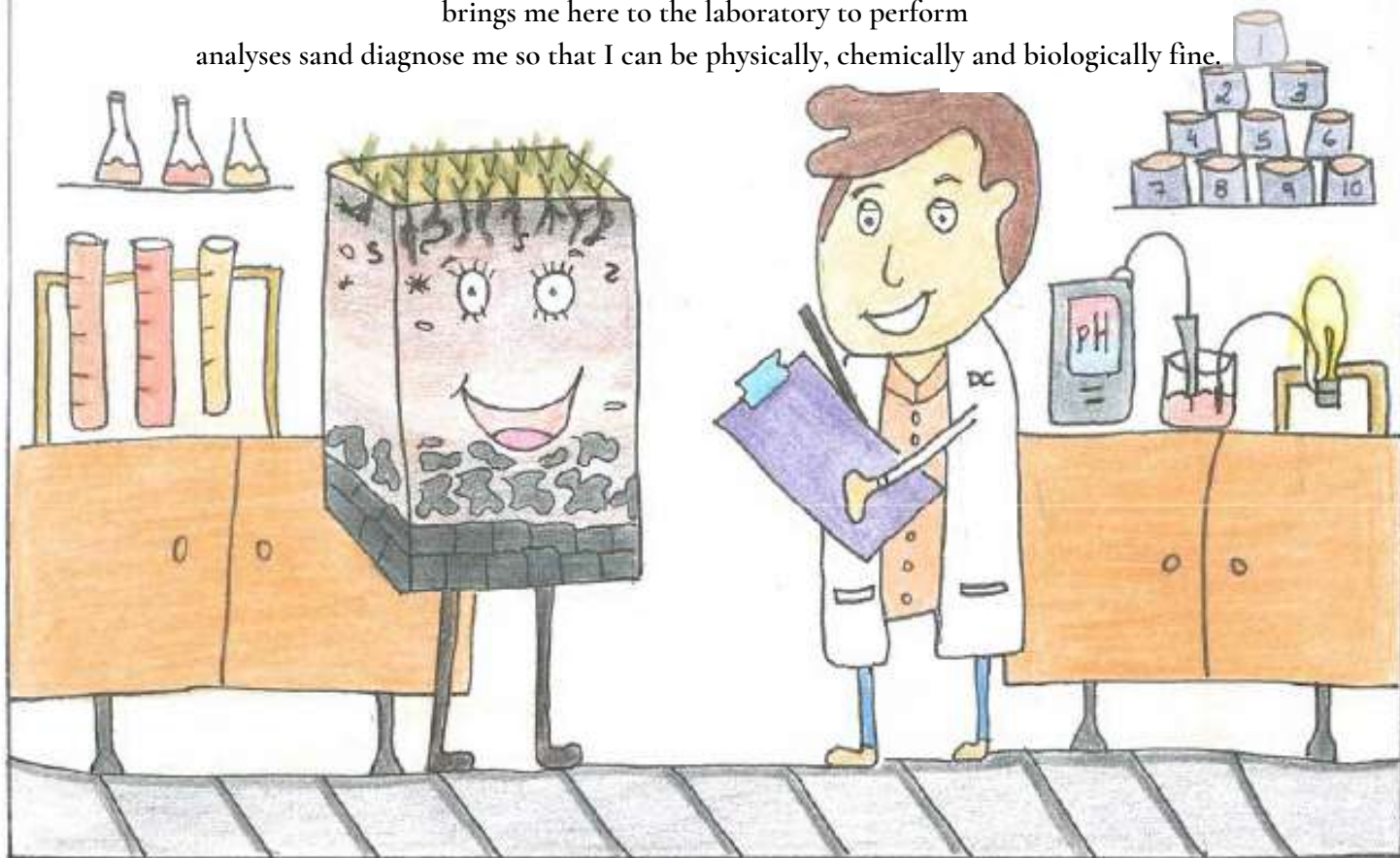
I have many functions, such as serving as a substrate for food production, providing biomass for animals and recycling nutrients, also serving to carry out the drainage of rainwater. Soil is also home to many microorganisms and insects.





I'm happy when it rains and I'm well structured, did you know? This water comes to me in the rain infiltrates my pores, supplying me with  $H_2O$ ! The problem is when the erosive process occurs. The water that doesn't infiltrate, drains superficially and take parts of me! I have a very interesting "super power" called Osmotic Potential: he is responsible for moving the water molecules in my profile in the following way: upwards (ascending), through my capillary characteristic and downwards, according to the force of gravity, associated with my infiltration capacity. It is in the soil solution that all the nutrients that plants need to grow and develop are present. I help to feed all humans and animals. Also, the water that is present in my body serves as a means for many chemical reactions and as a home for small organisms.

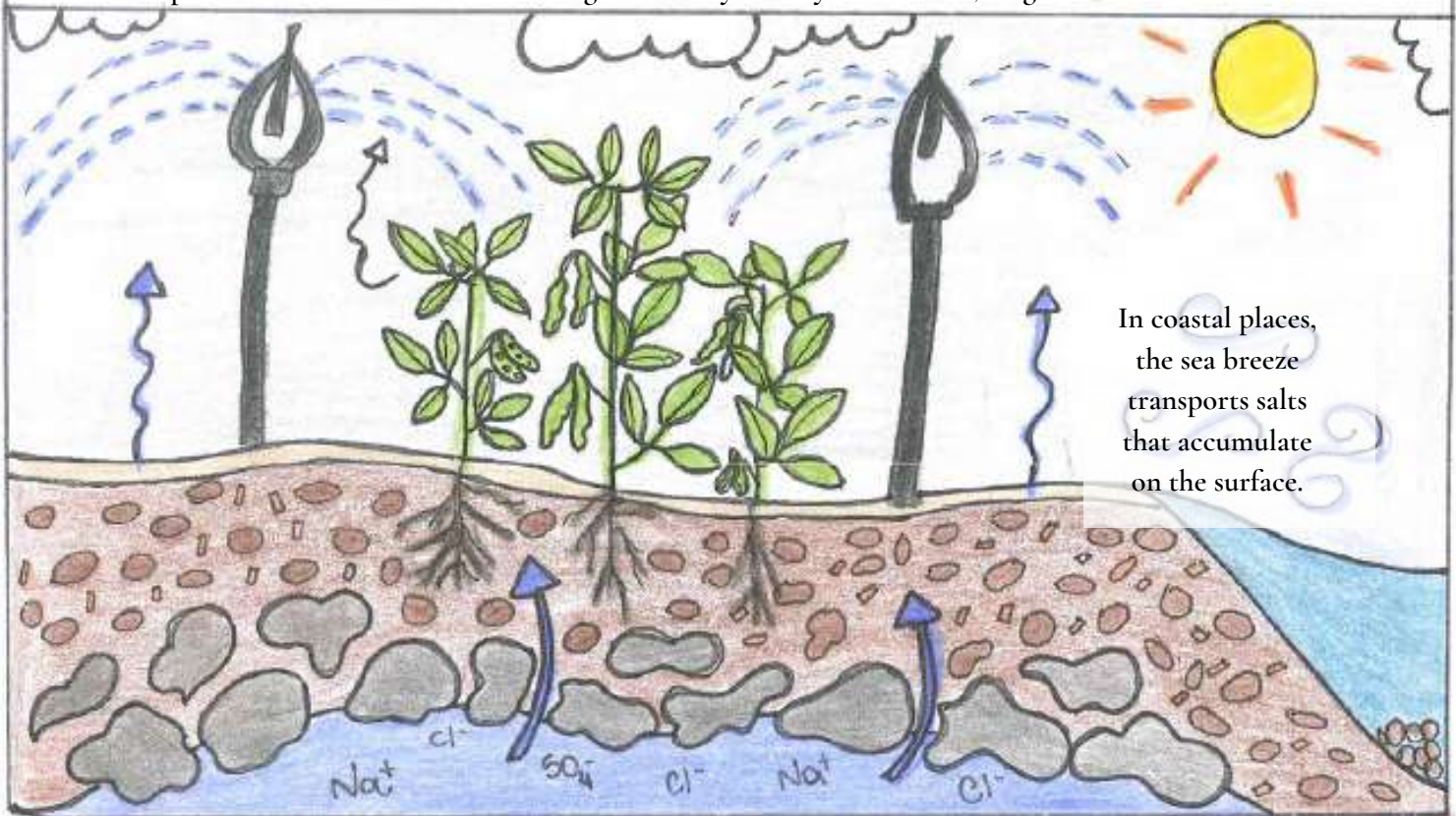
A properly managed soil results in a healthy soil that is very important for a good food production in a sustainable way. The soil management conditions in the region where I live are more delicate, because the environmental conditions make the soils here more prone to degradation. As it is essential to monitor these soils, mr. Soil Scientist brings me here to the laboratory to perform analyses sand diagnose me so that I can be physically, chemically and biologically fine.

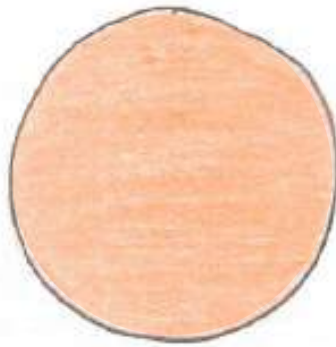


For me to be considered a soil with a good structure and not saline, there are some specific tests that the Dr. Soil Scientist performs, and they are: density and total porosity, electrical conductivity, chemical tests to determine the pH and sodium saturation and also the exchangeable amount of sodium.

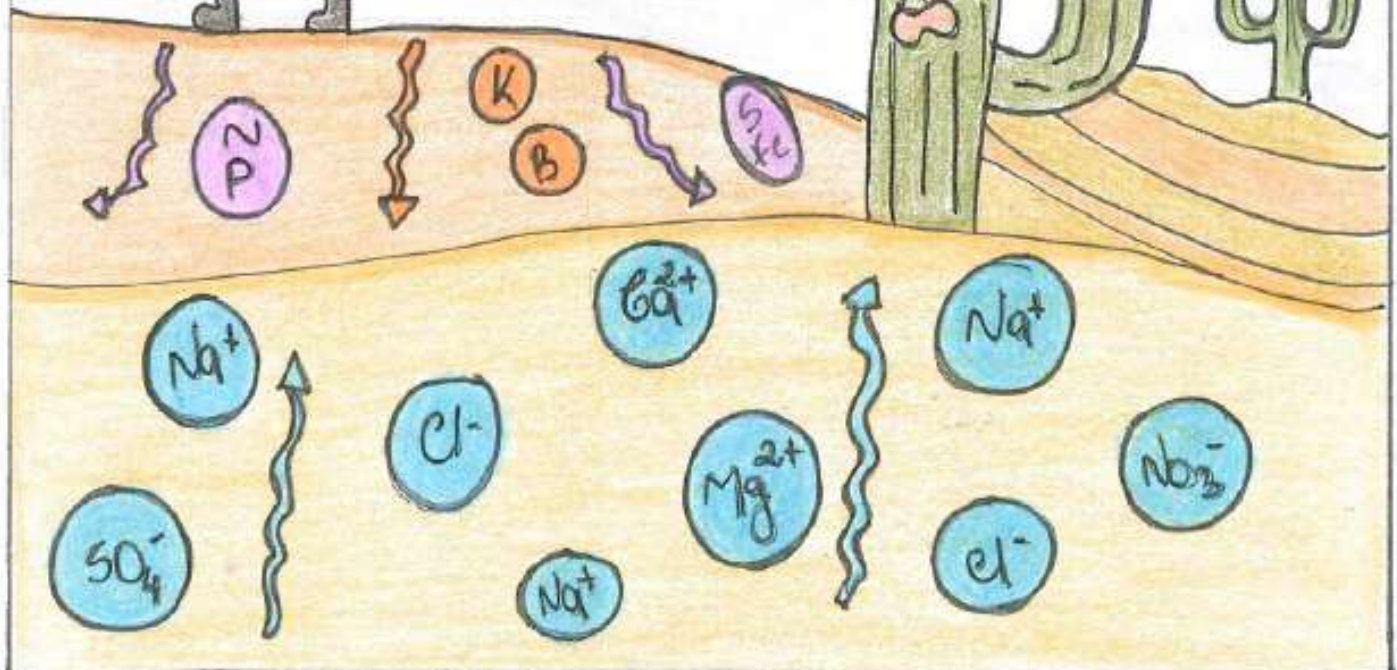
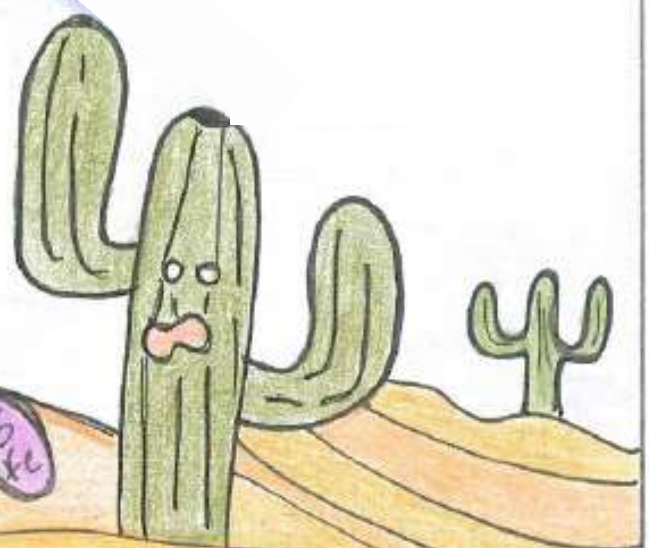
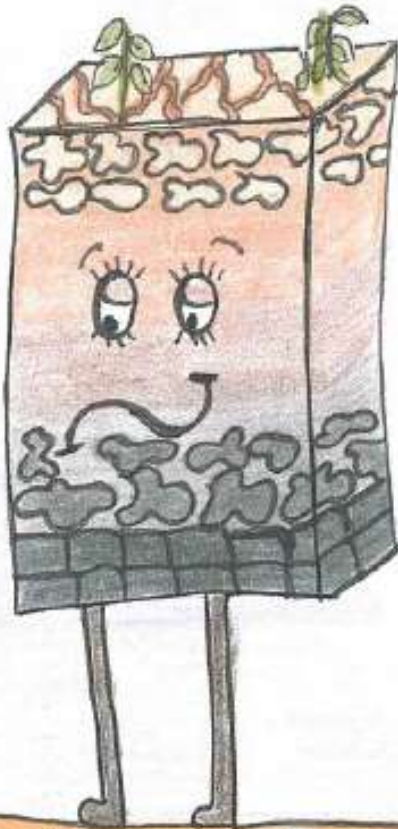
The main indicator and also the fastest for Dr Scientist to do the analysis is the electrical conductivity of the soil, and he knows that everything is right when I have a low conductivity value. When I have high values for electrical conductivity, Dr Scientist knows something is wrong.

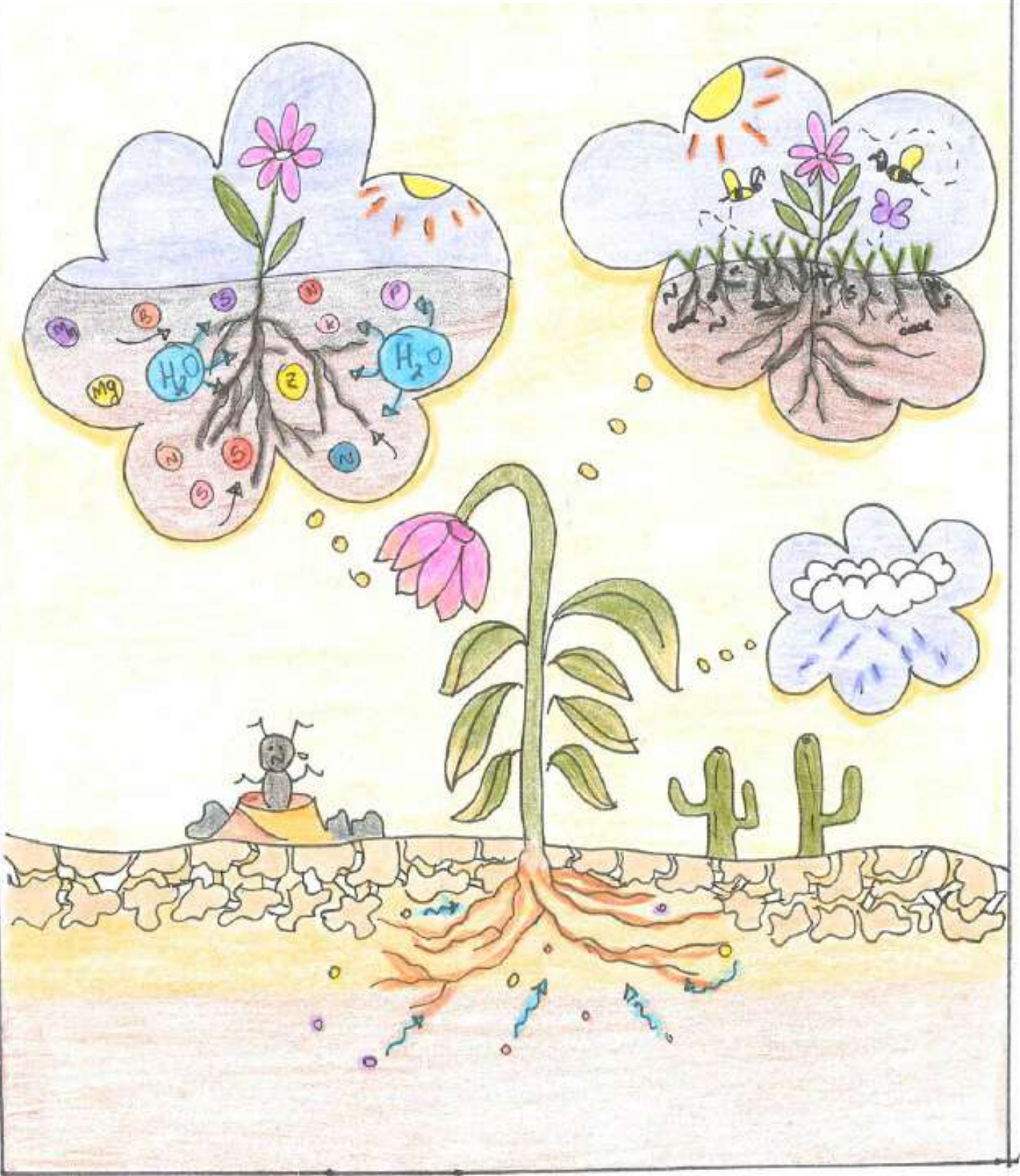
Where I live, the excessive heat with the scarcity of rain makes irrigation necessary to avoid a water deficit in plant growth. However, the water that is used most of the time is not of good quality and contains an excess of salts, which causes the accumulation of salts in the surface layer. Also, the high temperatures cause water to evaporate from the water table with the solution, the salts are carried away, these that accumulate on the surface and cause clogging of pores. The main salts that cause degradation by salinity are: sodium, magnesium and chlorine.



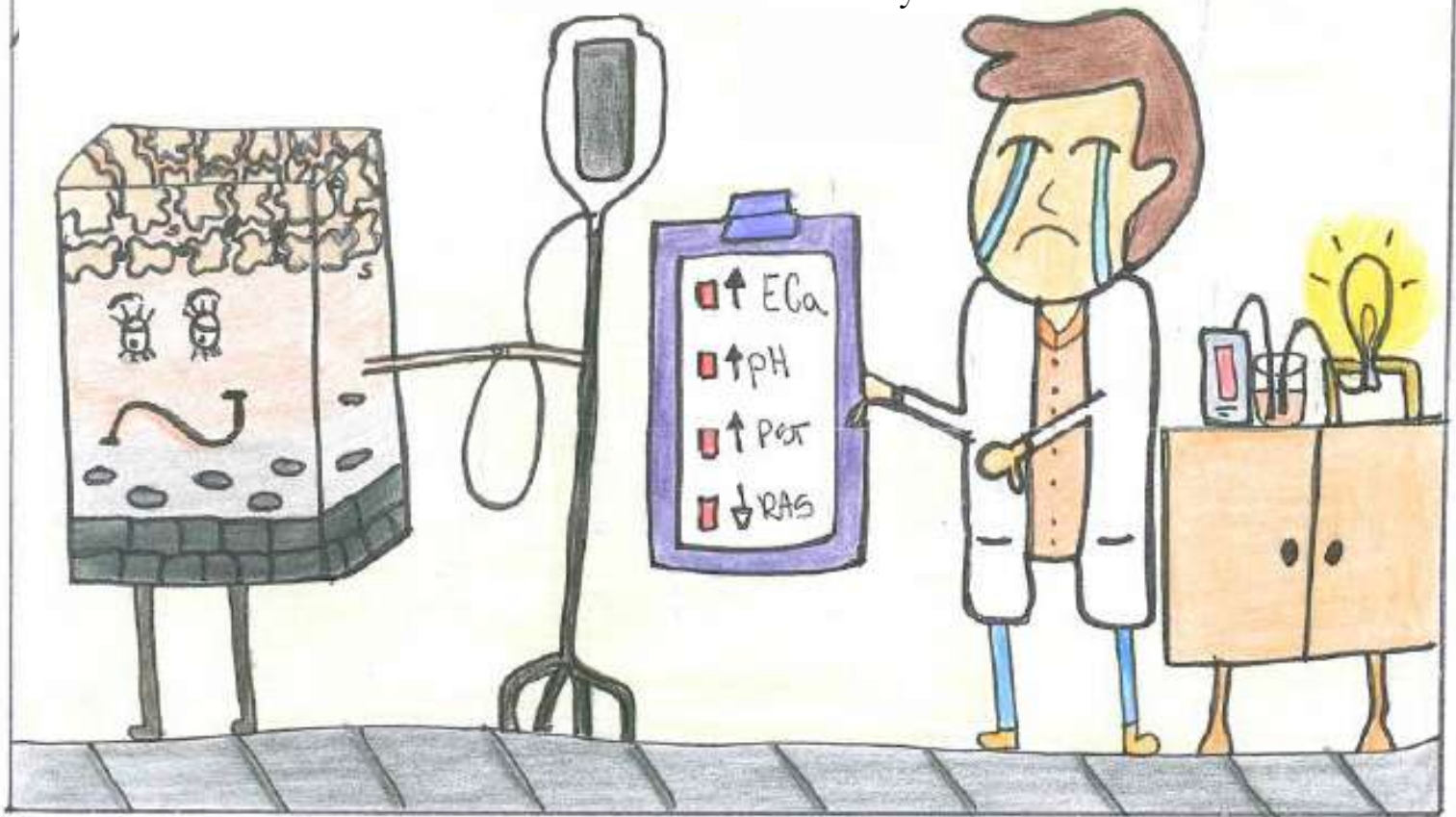


Currently, in the Brazilian Northeast, more than 25% percent of the cultivated areas are in the process of degradation by salinization. Salinization can take years to be identified, and I gradually get sick. That is why it is very important to continuously monitor the electrical conductivity of the soil. With the accumulation of salts, mainly due to sodium, I end up becoming denser and compacted and dispersed. Furthermore, because the chemical load of soils is monovalent, it increases clay expansion and . This change in soil structure also causes a change in chemical activity, leading to the loss and leaching of nutrients, making the soil poor for plant growth.



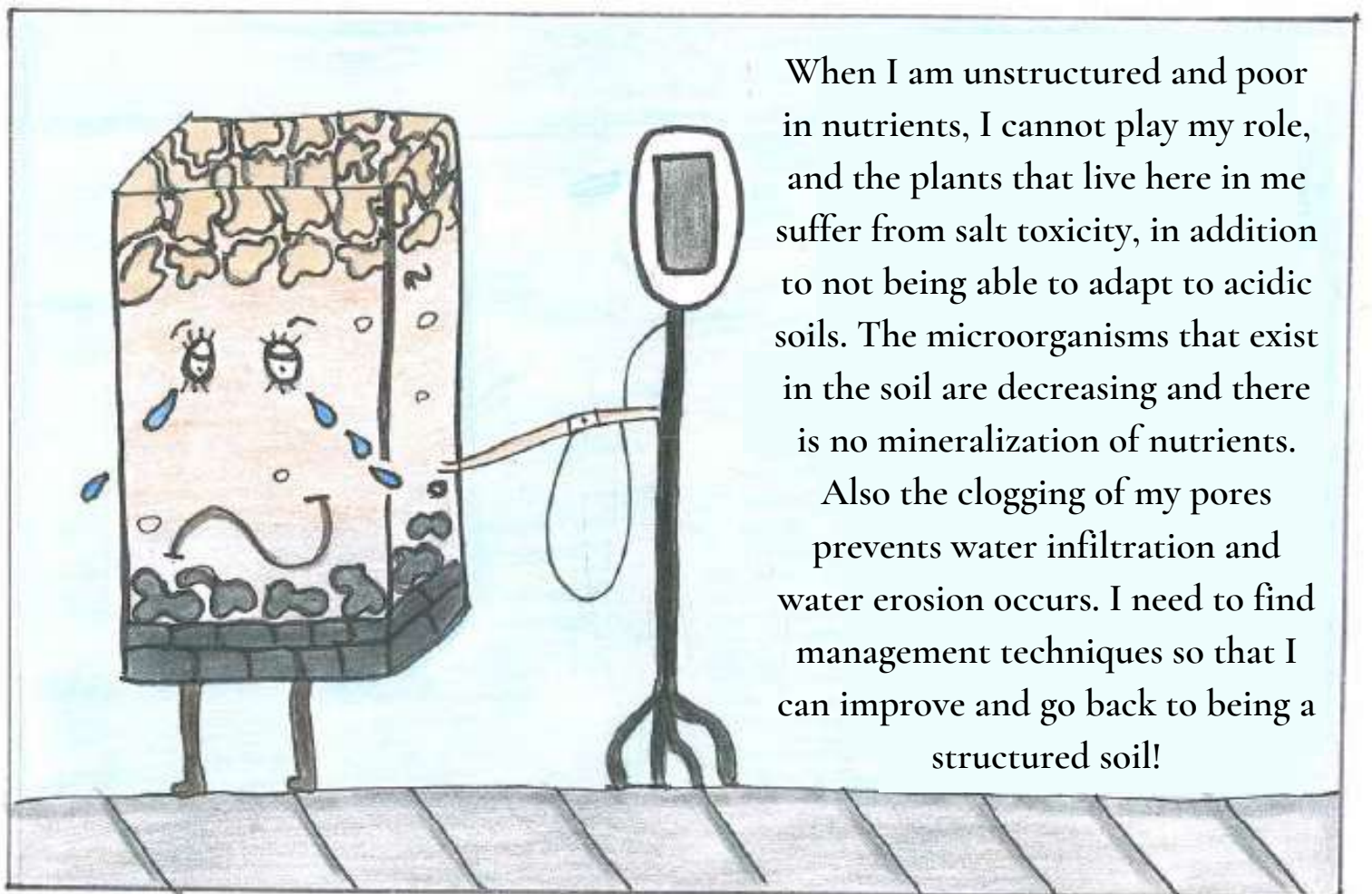


Dr Scientist can identify through laboratory analysis when I am in the salinization process. With the high electrical conductivity of the soil he can tell if there are too many salts in my pores. It can also identify which salts exist in the greatest number. Dr says when my pH is too low there are salts in the surface and sub-surface layers.

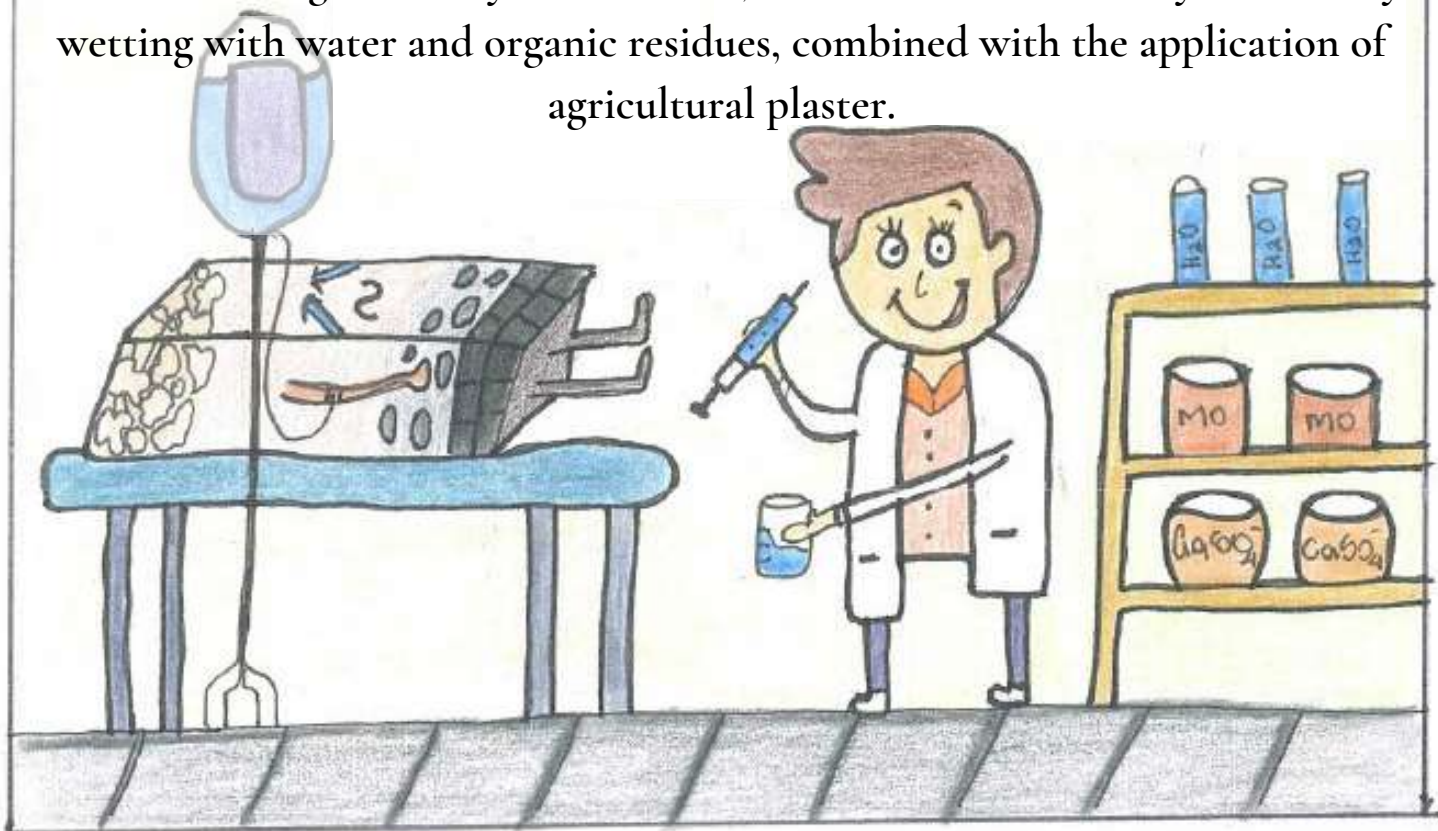


When I am unstructured and poor in nutrients, I cannot play my role, and the plants that live here in me suffer from salt toxicity, in addition to not being able to adapt to acidic soils. The microorganisms that exist in the soil are decreasing and there is no mineralization of nutrients.

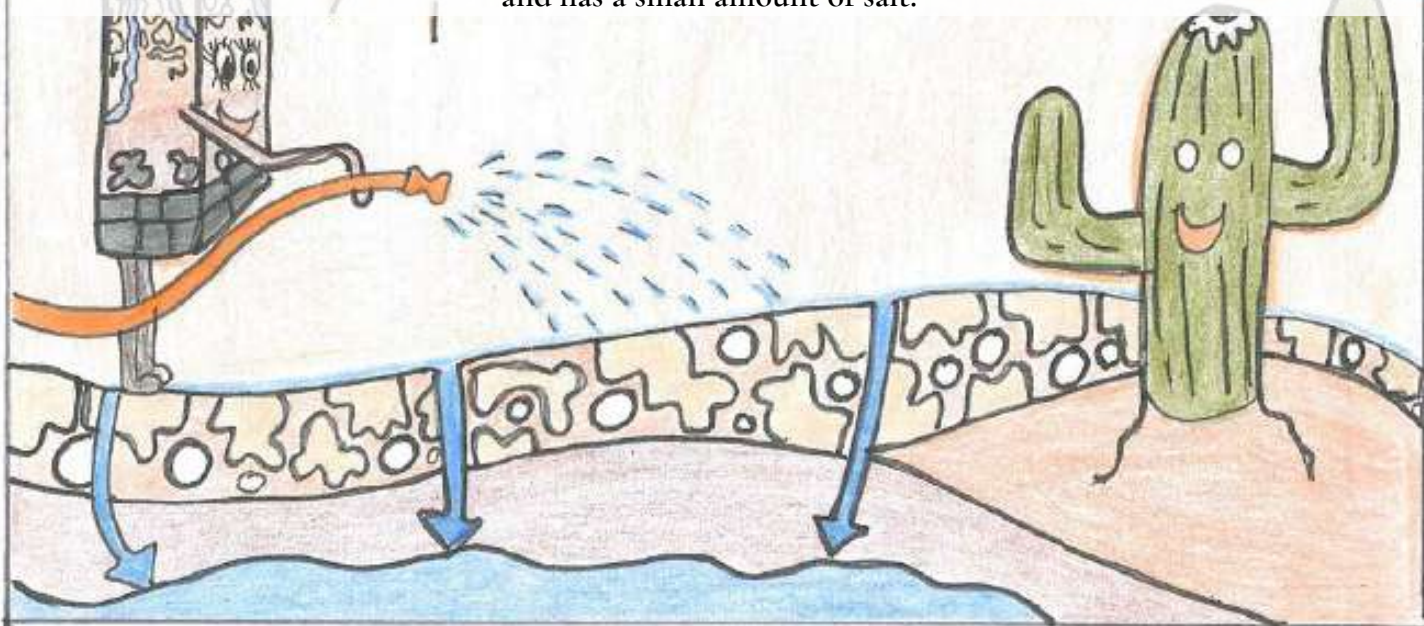
Also the clogging of my pores prevents water infiltration and water erosion occurs. I need to find management techniques so that I can improve and go back to being a structured soil!



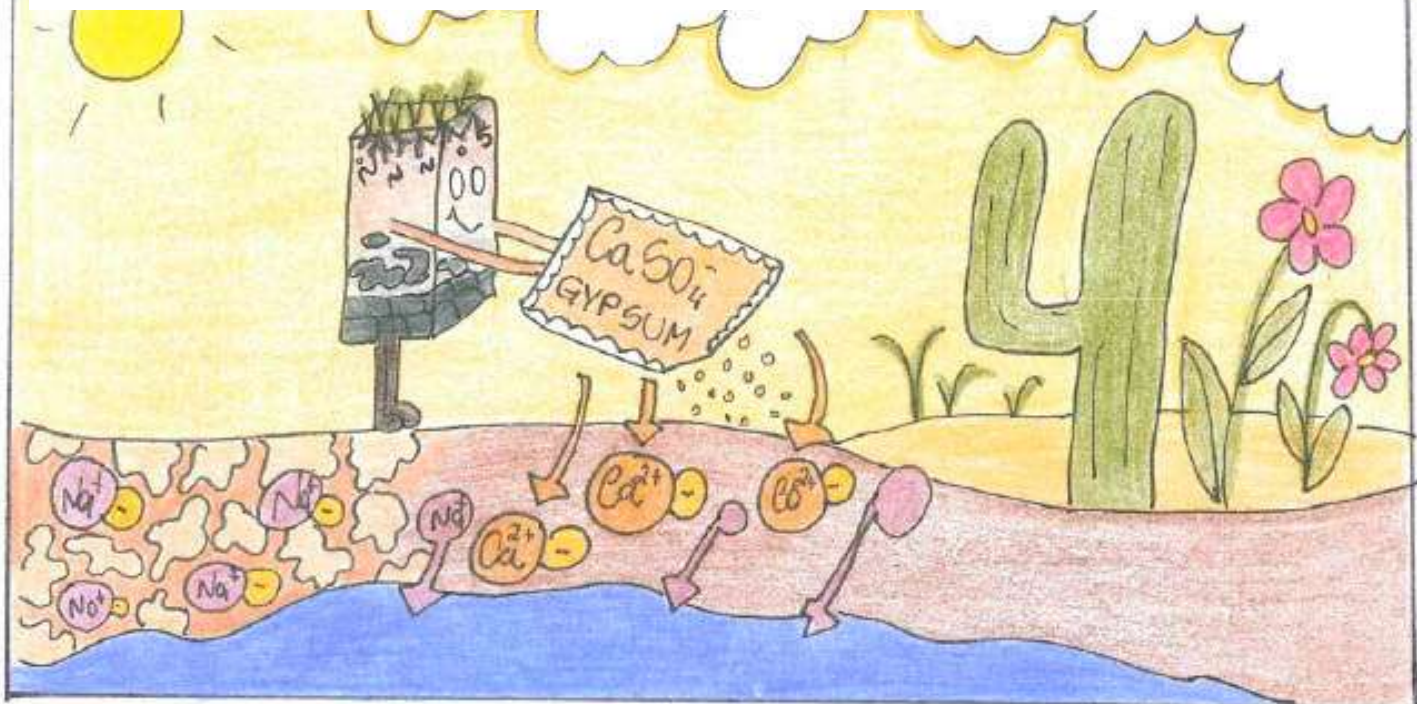
When my exams are not right, Dr Scientist needs to study me and study what needs to be done to reduce salinity. It makes decisions based on the results obtained through its analyses. However, he said that the best way is to do my wetting with water and organic residues, combined with the application of agricultural plaster.



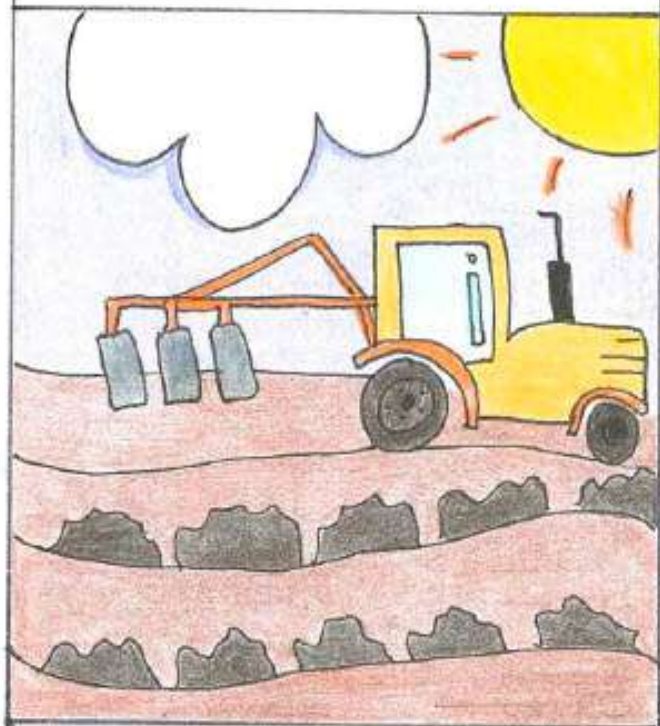
To control soil salinization it is necessary to use irrigation and drainage practices, as there is a need for water percolation in the soil profile, that is, the water needs to infiltrate me and travel through my pores. Along with the water that percolates in the soil, the salts also go down to the water table, unclogging the pores. The first step for pore cleaning to occur is leaching. It can be provided applying a water depth greater than the amount of water the plant needs. In this way the salts will be leached out. Leaching is the key to successful irrigation, in soils where salinity is excessive, it is also considered to be the only means by which soil salinity can be maintained at acceptable levels without risk to the crops. The water used for irrigation must be water that is considered to be of good quality and has a small amount of salt.



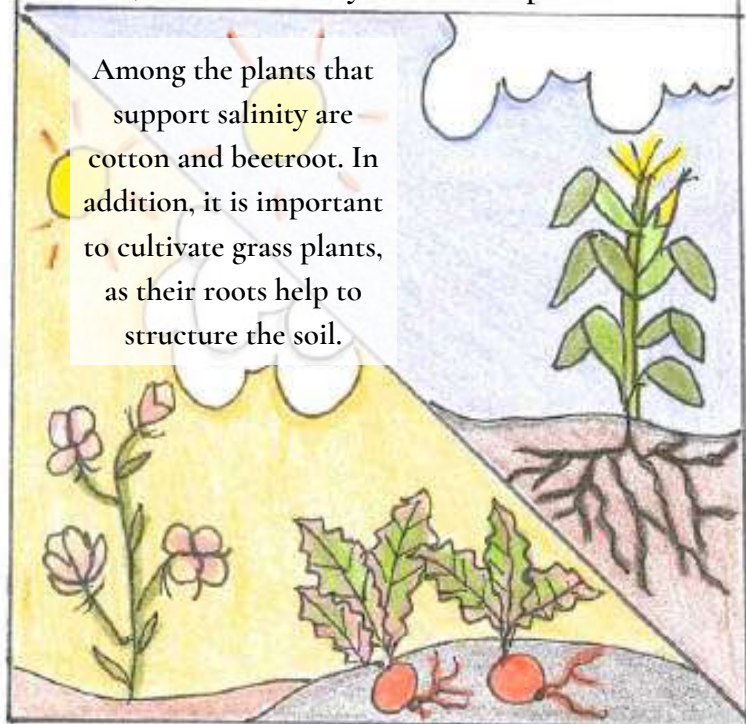
The application of agricultural gypsum is also important, that's why Dr Cientista do Solo performs all the exams to know the right amount to apply. He says that the calcium that is present in plaster, as it has a positive charge, takes the place of sodium in the connection with the negative charges. So sodium is easily carried along with water in the leach, and it no longer clogs my pores! That way I can move the water and air inside me!






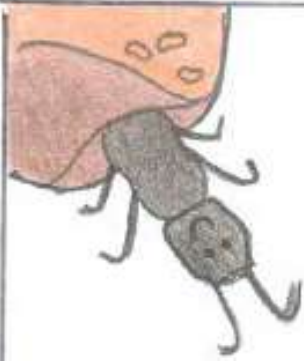
The Dr Soil Scientist also recommended the increase of organic material along with soil disturbance, as organic matter contains ions that regulate chemical bonds, causing weak bonds such as sodium to break down and it leach out.




In growing areas here in the semiarid region, it is important to use plants tolerant to salinity, because even if there is adequate management, because of the material that gave rise to Luvisols like me, there will always be a small portion of salt.



Among the plants that support salinity are cotton and beetroot. In addition, it is important to cultivate grass plants, as their roots help to structure the soil.





How good it is to be well and recovered!!!! With the use of proper management techniques I can keep the levels of salts in the soil within the tolerable range! Furthermore, there is no loss of soil and no degradation due to salinization. It is very important to be careful with me, I have the responsibility to support the productive cultures that will feed all the inhabitants of the planet.

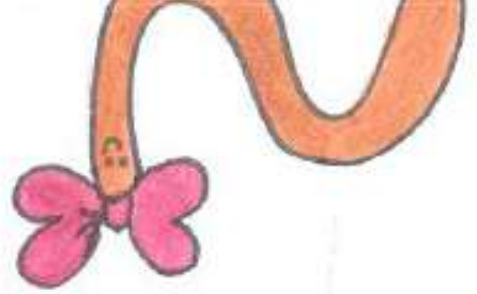


Every decade there is an increase in population and with that it is necessary to increase food production, and for that I need to be performing all my functions. It is essential that human beings conserve me and maintain my biological functions.

And now friends, are we going to take care of our soils and keep this resource in perfect condition?



Let's put into practice what we've learned?



Soil salinity is:

- a) Excess salts in the soil
- b) Excess nutrients that the plant needs.
- c) Few salts in the soil.

Why is excess salts in the soil bad?

- a) because it gets salty
- b) because the soil degrades and plants do not grow;
- c) the salt in the soil is okay.

Which soil class does Ricky belong to:

- a) Luvisols
- b) Gleysols
- c) Nitisols



Bye bye, thank you guys!!!