



Explanation of the functioning of the waterboxx

The *Groasis* waterboxx is a copy of Mother Nature. Mother Nature doesn't plant but sows, through birds or grazing animals, ON TOP of the soil. The manure functions as a cover so that a capillary = humidity-column develops. Then the seed germinates, develops its root in the capillary column and once water is found, the leaves develop and evaporation and photosynthesis can start. This technique works and therefore trees grow even in the Rocky Mountains or on the Alps that consist of granite stones.

So trees growing on rocks or in deserts is not a problem. Planting and germinating - bringing the tree through the period until it gets its water from the capillary - is the problem. That is what the *Groasis* waterboxx solves. It is therefore a planting concept.

The *Groasis* waterboxx copies Mother Nature:

- You put the *Groasis* waterboxx ON the soil
- Plant the small tree, preferably as small as possible so that it evaporates as less as possible: a small tree in just a plug, a nut or a seed is best. Any plant in a dry area should first develop its roots and afterwards its leaves. Any tree, resistant to local circumstances or seed is possible to use.
- The plug is planted maximum 10 cm deep and making the hole should be done in a way that the capillary is not disturbed.
- The main carrier in Mother Nature of spreading seed is the manure of grazing animals or birds. The box itself provides the same cover/protection as manure in Mother Nature does: it covers the soil to allow the development of a capillary water column ; it balances/moderates the temperature of the soil, preventing any extremes.
- On top of the box the cover produces water through condensation and by catching rain. As the *Groasis* waterboxx has a surface of 0,20 m² one can calculate the number of liters it catches by dividing the annual millimeters of precipitation by 5 (if the annual precipitation is 120 mm, the *Groasis* waterboxx catches 24 liters)
- Through an ingenious system the water *can get Into* the box, but it *cannot get out* of the box (through evaporation)
- The captured water is given - to the tree or seed the center of the *Groasis* waterboxx - by using a cord, using the same technique as the oil lamp principle. In this way we can divide the rain and condensation water over a period of 365 days to the young tree or seed.
- Now the tree or seed starts to develop its roots
- Meanwhile the water in the box absorbs heat during the daytime, in this way cooling the duct (= the centre of the *Groasis* waterboxx that is open on the bottom and top side) and gives heat to the same duct during the night. The duct also protects against fierce sun or dry winds and with all these aspects it creates a small friendly microclimate for the growing tree
- As soon as the root has found the capillary /normally after 6 to 12 months/ we take away the box (as happens in nature where the manure, after it has done its function, will be eaten by micro organisms) and the tree grows on its own
- With the polypropylene model we can plant the next tree with the same box. The box resists the climate well and therefore is expected to be able to use around 10 years. It is expected that depending on the climate it will be possible to plant up to two trees per year, but at least one tree per year. This means that you can plant 10 to 20 trees during the *Groasis* waterboxx lifetime. So using the *Groasis* waterboxx in order to plant trees costs between 25 to 70 cents per tree. The price difference is caused by the period that it is necessary to use it



until you can take it away once the tree can survive on its own and it depends on your buying price of the *Groasis* waterboxx.

- We also offer the possibility to use the biopolymer model. In this way we copy Mother Nature to the end where after helping the seed germinate and creating the capillary column, the manure is degraded by micro-organisms to nutrients that stimulate a better growth of the young sapling. The biopolymer waterboxx works the same: first it produces water helping the young sapling grow better and afterwards after being degraded by micro-organisms the box will be transformed in usable nutrients helping the sapling grow faster being more resistible to diseases. The biopolymer model also makes the organization and management of planting trees easier and cost effective.
- The best way to plant is a seed or a tree that is a size as small as possible. This means that the costs of planting material is in many cases lower than it is with the present traditional methods. Many times the savings on planting material, caused by using the *Groasis* waterboxx, will be equal to the cost of the box.
- This means that using the *Groasis* waterboxx might be done cost-neutral.
- The first tests in moderate climates show that the use of the *Groasis* waterboxx can also help giving a boost in growth of up to 10 to 15%, caused by the same reasons as mentioned above. This extra growth is also stimulated by preventing competitive weeds growing around the planted tree or seed. This means that 30 years afterwards one will harvest between 10 to 15% more m³ of wood, making the use of the *Groasis* waterboxx under moderate climates also an interesting economical case.

Extra info about results in the Sahara

After 9 months we took the *Groasis* from the trees planted with it. We have then done tests with 4 types of groundcover in order to keep the capillary intact. We have used carton, mulch, lose sand and a cloth of woven biomaterial (jute/coco/hemp/cotton). All 4 methods work well, so you may chose the cheapest option for keeping the tree alive after removing the *Groasis* in order to plant the next tree with it.