With the Groasis Technology you use 1 liter water instead of 10, while planting dry areas

The Groasis Technology is extremely efficient with water, this way allowing to one to plant in areas where water is scarce or expensive. The Groasis Technology helps the planter save money with eco-restoration, while – if the plantation is for agroforestry - also allowing the planter to make more money.

1. The Groasis Technology is not just about irrigation, it is a planting technology

1.1 A planting method

The Groasis Technology (GT) is an **integrated planting technology** to plant in dry, eroded, degraded farmland and rocky areas. It is *not* a way of irrigation. When planting with the Groasis Technology, during the first year water savings are more than 90% when compared to any other planting method. From the second year onwards no water is added as irrigation is not needed, and savings are 100%. (*)

The Groasis Technology is a biomimicry technology and consists of:

1) improving the soil with Groasis Growmaxx compost and mycorrhizae
2) mapping the area through 3D imaging to define ideal planting lines
3) harvesting over 90% of the rainfall with the help of Groasis Terracedixx
4) leaving the capillary structure intact and making the correct planting hole with the Groasis Capillary drill
5) using plants with the right primary roots which are not twisted, but extend vertically downwards
6) using the Groasis Waterboxx
7) using the Growsafe Telescoprotexx plant protector against heat in the summer, from frost during the winter and from grazing by animals

The Groasis Technology is a copy of how Mother Nature plants. The survival rate is on average in excess of 90%, no matter how difficult the circumstances are. (**) Other planting methods limit planting to take place only in certain in seasons. The Groasis Technology enables one to plant during 12 months per year, independent from the season and no matter the temperature. This allows a planter to plan and industrialize the planting process. If the Groasis multiple capillary drill is used, previously unimaginable big areas can be planted each day.(***)

(*)http://www.groasis.com/download/projects/univalladolid/univalladolid_oct2012_en.pdf
(**)http://www.youtube.com/watch?v=Se6cr-sFZGw
(***)http://www.youtube.com/watch?v=suOhAvi8JiQ&list=UUjI5jo9A8z3tmIhyX4Qf0GA

1.2 The reason of the success of the Groasis Technology

In most locations ground water can be found at a depth of 3 or more meters. (****) The problem for a plant in dry and eroded areas is that the first 3 meters of top soil are dry. The air temperature is also high and frequently there are strong winds. After planting in these

dry areas the plant often has not got enough time to extend its roots deep enough to find the ground water. The plant subsequently dries out and dies. The Groasis Technology helps the plant to grow its roots 3 or more meters deep in the first year. Once the plant reaches this depth, it is able to grow independently and will not die anymore.

(****)http://www.youtube.com/watch?v=EXcw7BCOGaU&list=PL5MDcgMmY2CWXN3s3e1pxfctPiY1e5oga

1.3 The Groasis Technology is inexpensive

Planting trees with drip irrigation is extremely expensive. With drip irrigation there are eternal costs for energy and maintenance. Pumps and tubes need to be replaced every 5 years. Besides that water is scarce and we better use it as drinking water. The Groasis Technology uses no pumps, tubes or energy, and very little water. Only in the first year there are some low costs. After one year there are no costs anymore. Mother Nature has always been able to grow without irrigation. With the use of the Groasis Technology the planter can again use that force to grow sound and healthy products, without irrigation.

1.4 The Groasis Waterboxx

The majority of the trial plantings have been carried out with the polypropylene Groasis Waterboxx. The Groasis Waterboxx is an investment of 12 to 20 Euros for the user, depending from the quantities he buys. It can be used approximately 10 times, so the costs per annual planting are approximately 1,20 to 2 Euros.

Groasis Waterboxx / developed between 2003 – 2010 / since 2010 over 300,000 Waterboxxes have been supplied to experimental plantings in over 20 countries

Groasis Waterboxx in Los Monegros degraded farmland Spain. Trees planted in 2011 soil with 70% stones with survival rate over 90%. Most extreme place of Spain: summer over +40°C – winter lower than -10°C

1.5 The Groasis Growboxx

In 2010 Groasis started the development of the biodegradable Groasis Growboxx. The Groasis Growboxx is made of cellulose and can be made from recycled paper or unmarketable plant material like potato peels, palm leaves, hay or straw, etc.. With this material Groasis can produce a “throw away” box that is biodegradable.

Groasis Growboxx development / from 2010 until now / over 8,000 boxes tested in 16 countries / the image shows the 4th prototype

Groasis Growboxx 3rd prototype in Los Monegros degraded farmland-Spain. 2,500 Growboxxes with trees planted in 2013 soil with 90% stones with survival rate over 90%. Most extreme place of Spain: summer over +40°C – winter lower than -10°C

The Groasis Growboxx development faces many challenges. At first paper is a material that is not capable of holding water for a year. A lot of investigation on holding water based on the use of safe additives is carried out. One can easily make a box of paper that holds water over a long period, with bitumen. However, since the box is also used for the production of food, such kind of additives are not acceptable. The same is valid for the challenges of slugs, ants, termites, funguses and all kinds of other life forms that form a threat to the function of the Growboxx. Natural repellents have to be identified and tested.

We have done 3 years of tests now in 16 countries. The termite problem is solved, the water resistance problem is still a challenge. During 2014 the 4th prototype has been introduced. Inspired by Google and its "Glass" introduction method, Groasis started a crowd sourcing action to invite organizations and entities to cooperate with her to do experiments with the 4th prototype. Hundreds of participants have subscribed and will help by carrying out experimental plantations across the globe during 2015.

This excellent video informs you about our *Growboxx investigation program* in Spain Life+ "The Green Deserts" http://tinyurl.com/p4qu4x9 .

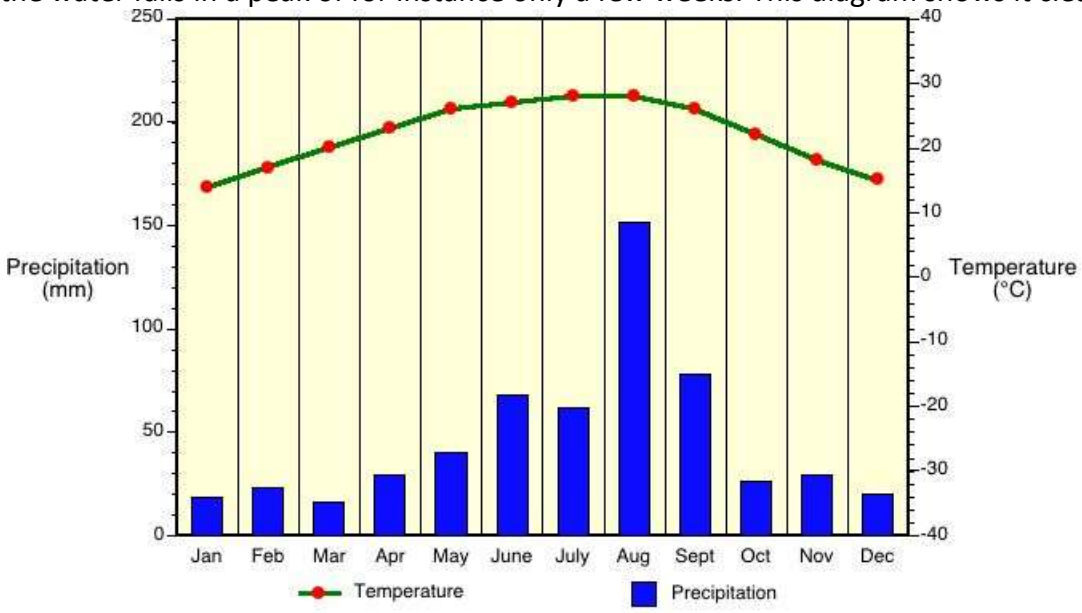
2. The soil preparation

2.1 Explanation

Before explaining the proposal, it is important to explain the Groasis Technology method in detail. This way the reader will understand that this is a revolutionary integrated method that can help us reclaim all manmade graded farmland the next decades.

2.2 Degraded farmland receives more rain than we think

During phase 1 we start the harvest of rainwater and concentrate the collected water to the tree. This way we can multiply the available quantity of water for the trees, and distribute it on a regular basis. In many deserts rainfall is more than expected. Holland has 650 mm of rainfall per annum. The degraded farmland of Monterrey Mexico has 680 mm rainfall per annum. The problem in many degraded farmland areas is not the quantity. The problem is that the water falls in a peak of for instance only a few weeks. This diagram shows it clearly.



Average precipitation and temperature of Monterrey degraded farmland - Mexico

2.3 Rain harvesting

The next problem in many degraded areas is that the rain falls on slopes and then flows out into streams and rivers that convey the water to the sea. This is precious fresh water that gets lost. When areas are degraded and eroded, there is often a hardpan and only 25% of the water enters into the soil. 75% loss of water floating down the hill, with 1 mm (!) of rain and an area of 1,000 hectares, this is over 7,500,000 liters of water. Even in dry areas there is often a rainfall of over 200 mm. This means that if we have a dry area of 1,000 hectares, there is 200 mm of rain and 75% doesn't enter the soil, we need a basin of 1,500,000,000 liters. Imagine how much fertile area gets lost if we need to dig basins of this size in fertile valleys. So this is not an ideal solution.

In traditional cultures local communities were smarter. They solved the loss of rainwater by

the construction of terraces in the hills and on mountains. If rain falls on the terraces it flows down *into* the terrace soil, so it stays in the hill or in the mountain instead of flowing into the rivers. This way it will be available to the plant.

Nowadays fewer and fewer people live in the hills and mountains as a result of migration from rural to urban areas. Nobody builds terraces anymore. Existing terraces are getting lost. We need to develop another method that achieves the same goal, namely that rainwater doesn't run off the slope, but penetrates the hill or mountainside instead.

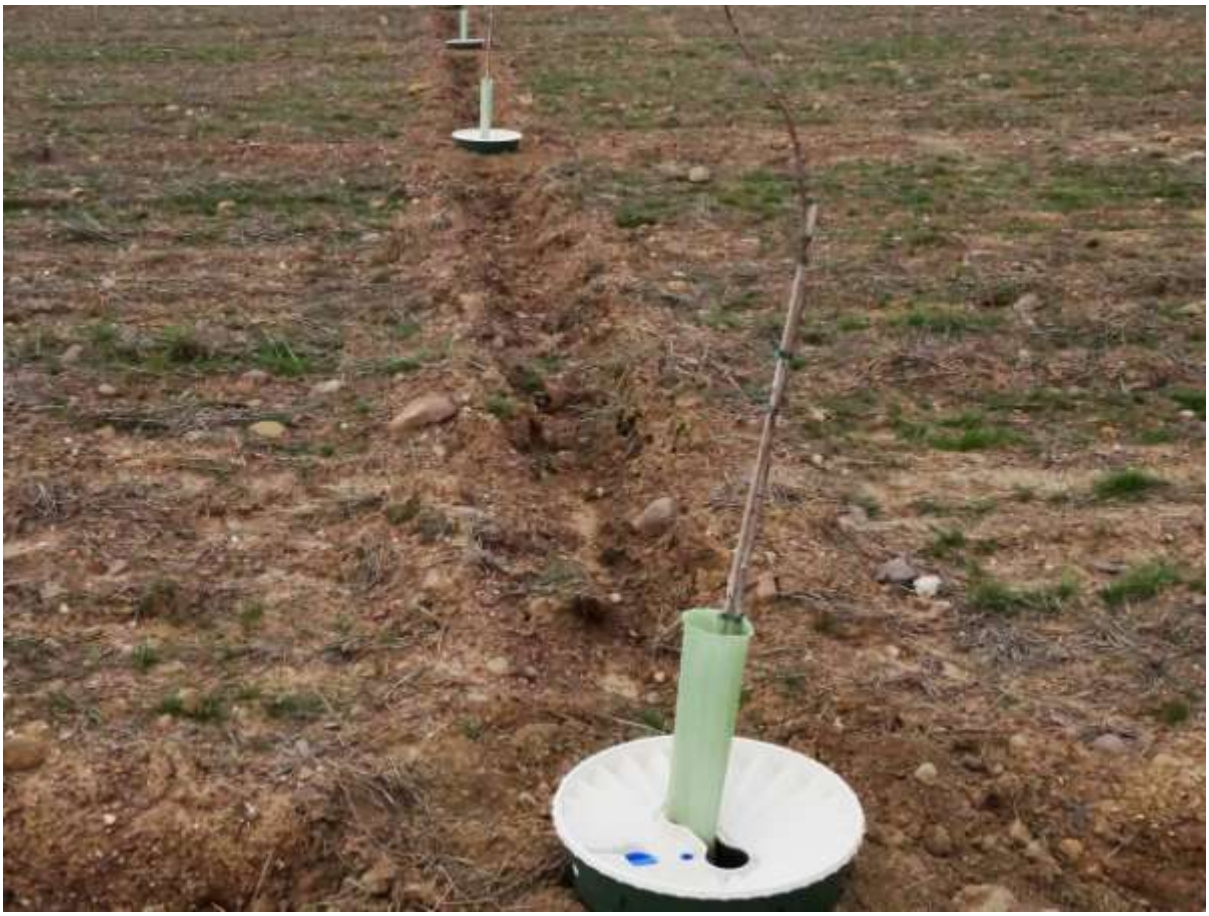
Terraces in Peru - Latin America

2.4 New method to copy traditional solution

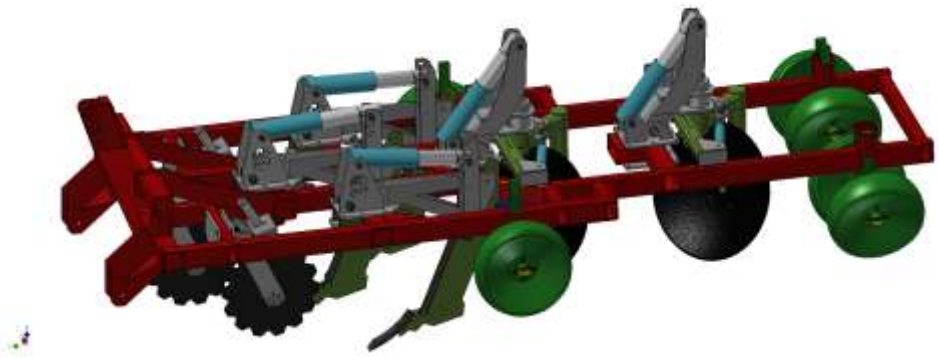
The new way of building terraces on slopes is a brand new Groasis invention. We call it the "Mini-Terracing" method. In principle it is inspired by the traditional terracing method and has an equal result. However, it is has two important differences.

1) The mini-terraces are made by machine, so they are cheap, easy and fast to make
2) The mini-terracing method is designed so rainwater is canalled to the planted trees. This way we raise the available quantity of water to the planted trees.

The Terracedixx works transverse on the slope of the hill or mountain. It creates a “crack” of 60 cm deep and next to the crack it ploughs a small “canal”. This way we break the so-called “hardpan” or crust which stimulates that oxygen and water can penetrate the soil. The canal collects the rainfall that flows off the inclined slopes and helps it penetrate the soil via the crack where the trees are planted. The canals are made exactly on the place of the plant rows.



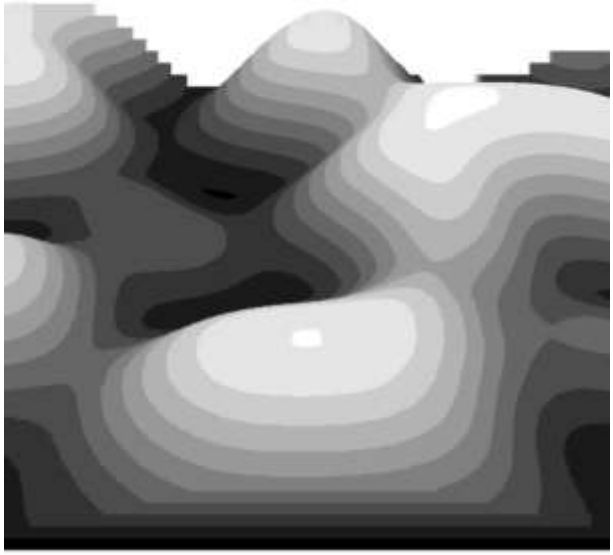
Groasis Waterboxx in canal of Groasis Terracedixx



The Groasis Terracedixx

2.5 3D imaging and mapping

Together with Professor Zacarias Clerigo of the University of Valladolid in Spain we have developed a 3D imaging and mapping method. With the help of a drone we photograph the slopes that we want to plant in 3D images. With the help of the computer the ideal future plant rows are determined on the slopes through GPS mapping. This way we can avoid too steep places, non-plant able places caused by pure rocks, or avoid obstacles such as trees. Then we can install the GPS points in the tractor with the Groasis Terracedixx, which has GPS managing equipment. The tractor can be driven by a chauffeur, or do the work 24 hours unmanned. This way we can speed up the planting of degraded areas in the same way as we harvest corn or wheat.



3D imaging of slopes with calculation of ideal lining of plant rows

2.6 Groasis capillary drill

The Groasis capillary drill is a machine that makes planting holes for the tree in combination with the Waterboxx. Degraded areas are hot and often the soil is loaded with stones and rocks. The Groasis capillary drill has a drill head that is copied from the oil industry drills. This way it is able to drill planting holes in each type of soil, no matter how hard it is. With the same GPS information that we use to make the mini-terraces, we make the planting holes exactly on the place where we created the crack with the Terracedixx. The multiple Groasis capillary drill is able to make 6,000 planting holes per day. This capacity is needed if we want to replant millions of hectares of degraded farmland each year.

Groasis Multiple Capillary drill – 6,000 perfect planting holes per day

2.7 Multiplying the efficiency of rainfall

Through the mini-terracing method in combination with the capillary drill, we multiply the effects of rainfall. The trees are planted in the planting holes with the Groasis Waterboxx. These may be made of a 10 times re-usable polypropylene model or a single-use model made of cellulose, the Growboxx . Due to the collection of water in the channels, which then transfer the water to the planting holes which are made slightly lower, all the rainwater is concentrated where the planted trees grow. Through the method, the amount of available water to the trees will increase between 25 to 75 times. The reason is as follows : the average density in dry areas is about 25 m² per tree. On a slope with an un-cracked hardpan (impermeable layer) only between 25 to 75% of the water penetrates in the soil. The mini-terracing causes that more than 50 to 75 % of the rainfall penetrates into the soil, and concentrates the rainfall to the place where the tree is planted. This way the rainwater volume that falls on 25 m² - caused by the planting distance of 5 x 5 meters - concentrates on 1 m². This result means that numerous currently unproductive areas become available for food production by planting food producing trees (e.g. fruit/nuts).

By combining the Terracedixx and the capillary drill we concentrate sufficient quantities of water to let the planted trees grow fast. The majority of the available rainwater is harvested.

2.8 Groasis Growmaxx

Roots are the instrument of plants to collect water and minerals from the soil. The characteristic of dry and eroded areas is that there is little water. Fertilizers however need a lot of water in order to be dissolved and to be able to be absorbed by the roots. Groasis has searched for another way to feed plants. The characteristic of degraded and eroded areas is that the rainfall periods are short. During long periods there is little or no water available to dissolve the fertilizers. It means that we have to find another solution to feed the plants. The instrument to do so is mycorrhizae (funguses). Mycorrhizae – just like water - dissolve minerals in the soil. However, their methodology is different. They are the intermediate between the roots and the soil. Roots do not directly eat and drink from the soil. They interchange water and minerals with mycorrhizae through interchanging sugars. 30% of the sugars produced through photosynthesis by the tree is delivered to the mycorrhizae. For this reason the humus percentage in soils rise over years if soil is covered with trees. Over the last 3 years Groasis has done a lot of research to the working of mycorrhizae. It is necessary to treat the soil with the correct “species”. The optimum mycorrhizae which has proved to be best working, has been determined and is being ‘multiplied’ now. The problem of costs has been solved in a very intelligent way. Mycorrhizae multiply very fast under ideal circumstances: warm and humid. Groasis found that it is not necessary to treat the whole soil, but only necessary to treat the growing area of the root tips. This method considerably reduces the quantity of mycorrhizae needed per hectare. Mycorrhizae have a remarkable characteristic: they colonize an area and once it is colonized, they do not let other mycorrhizae enter easily. If you take a Petri dish and put 2 mycorrhizae in it, on each side one, they grow into each other direction, but then stop and leave a “nowhere-land” between them. This means that if we colonize the root tips in the earliest stage, through inoculation of the plant medium while multiplying in the greenhouse, and while planting in the soil, we can protect our roots against damaging funguses, like pythium. This method also reduces the need to use fungicides. We can stimulate the absorption of minerals and water by adding the right “species” of mycorrhizae with whom the roots have the optimum symbiosis. Groasis patented a perfect method to dose the mycorrhizae on the right place and in the right quantity. We have re-designed a coffee-pad producing machine and pack mycorrhizae and organic fertilizer in the pad. The tissue paper easily degrades and the mycorrhizae and organic fertilizer come slowly dosed available for the plant. The mycorrhizae colonize the area below the roots before other mycorrhizae can damage them. In the same time they help dissolving water and food for the plant. In order to stimulate this process Groasis makes a planting hole one day before and fills that with 40 liters of water. The water sinks in the soil through gravity and creates a so called “capillary column”. This column has almost 100% atmospheric humidity and creates the ideal circumstances for the mycorrhizae and root development. The atmospheric humidity will cause the column to be colonized within a week. The method is extremely cost efficient as the inoculation is not done on the whole field, but only at the root tips. Through packing in pads it is secured that the right doses will be given to the plant. We call the method mycorrhizae Groasis Growmaxx.

The method of adding mycorrhizae will feed the plant.

Growing tomatoes in Ecuador with the use of mychorrizae to replace fertilizer

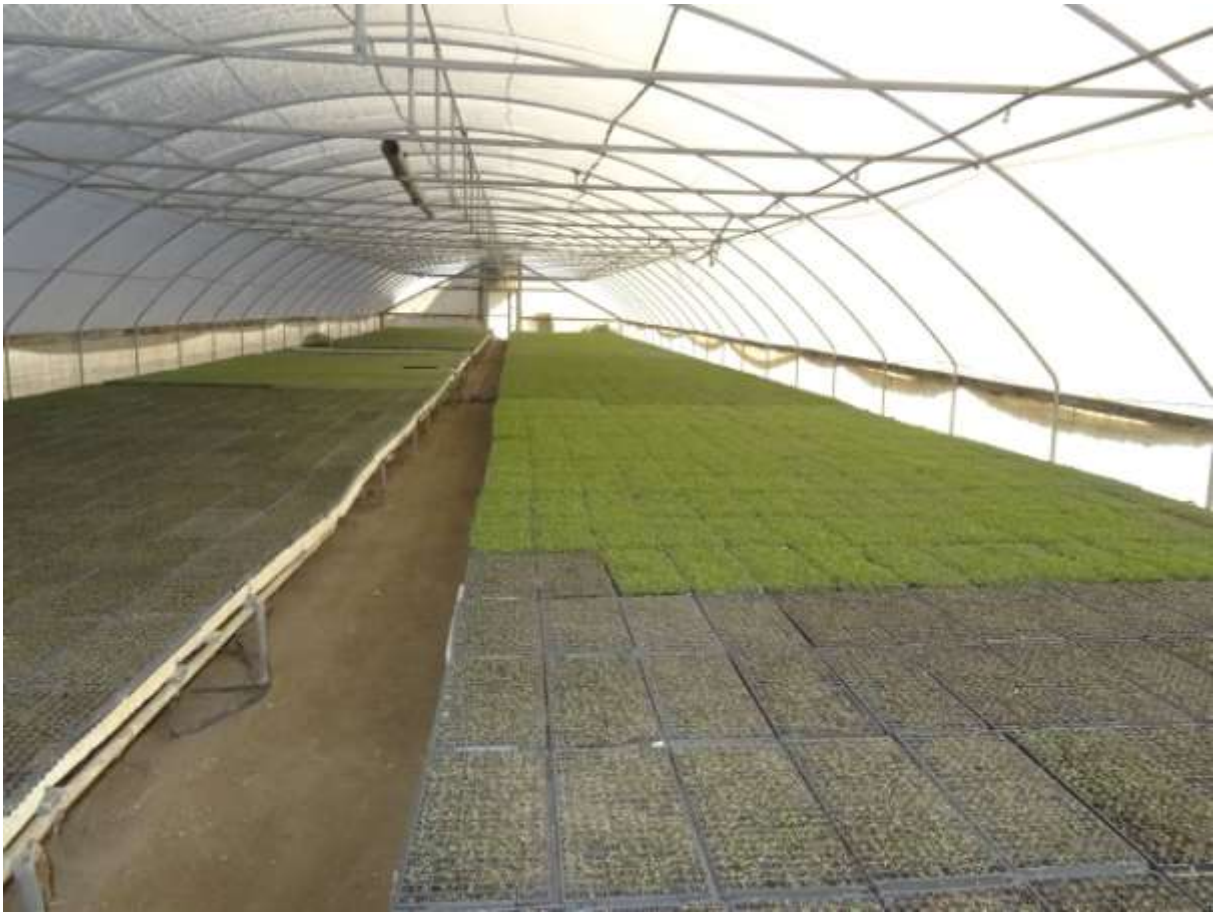
2.9 Conclusion

We have now organized the soil preparation, rainwater harvesting and feeding of the plant.

3. The planting preparation

3.1 Plant preparation

Only sound and strong plants can survive in a degraded areas. If the planting material is weak, it will burn within a week after planting, even if sufficient water is given. Three months before planting – while the plants are still in the nursery – they are exposed to the full sun. In order to protect them from burning they are sprayed hourly with a little water. After a while the intervals between spraying are made longer. Slowly the leaves get hardened this way, until they are able to withstand the full sunlight. Once this stage is reached, they are ready to be planted without the risk of burning.



Top quality saplings of Prosopis sown in Kenya

3.2 Root and branch pruning

Through 11 years of research Groasis has found that it is necessary to prune both the roots and the plant while planting. The plants' side branches are pruned in order to prevent evaporation after planting, because the root system is not active yet. The roots are pruned because they tend to grow horizontally in the pot when they are moved from the nursery to the field. After taking plants out of the pot, we prune the horizontal growing parts of the primary root. These horizontal roots will never grow vertically downwards again, as it is in the "memory" of the root. After pruning the horizontal parts of the roots however, the new sprouts grow vertically downwards again. Now the roots are able to penetrate the soil and grow over 3 meters deep again in the first year.

Horizontally growing primary root in pot

Washed horizontally growing primary root in pot

9 years old Platanus root, still horizontally growing, not penetrating downwards to search for water

Pruned root – all horizontal parts are cut off

Vertical resprouting of primary roots after pruning the horizontal parts

3.3 Species

We have to carefully select the species that we plant. A tree that cannot withstand +40 ^{o}C cannot be planted in Dubai where summer temperatures go over +48 ^{o}C . A tree that cannot grow with less than 300 mm of annual rainfall, cannot be planted where the annual rainfall is 200 mm. So the species that we select need to be able to cope with the circumstances where we plant them.

Groasis are continuously updating a database containing the characteristics of hundreds of potentially interesting species, both from an environmental and an ecological perspective, which contains the environmental boundaries for each variety. In 2015 the Groasis “Drought tolerant tree encyclopaedia” with over 1,900 species and superb search functions will be launched.

Saman tree – planted in Ecuador – until +40,5°C – annual precipitation 211 mm – 8,000 joules highest light intensity of the world – 17 months old with only 80 liters of water

3.4 Capillary column

Groasis' research has shown that plants need a lot less water to grow than what is published about this subject. Groasis found that plants often need atmospheric humidity instead of large quantities of water. With the Groasis Technology we plant trees with in total a one-off supply of 80 liters of water. Drip irrigation uses, during the summer period, eternally approximately 15 liters per day. By working with atmospheric humidity instead of with pure water, we increase the efficiency of water use considerably. Groasis has successfully grown tomatoes in the Netherlands with only 15% of the supplied water quantity compared to the drip irrigation test group. We were still able to harvest 84% of the crop (in kilograms) of the drip irrigation test group. Whilst six times less water was supplied to the plants, the harvest was only 16% less. Over time we have learned to create atmospheric humidity . We make the planting hole one day before planting and put 40 liters of water in it. The water sinks into

the soil through gravity and creates the atmospheric humidity. In the same time we have noticed that it softens the hard soil into a soft, for the roots easy to penetrate, mass. The next day we open the top layer to let oxygen enter. After an hour the soil is ready to get planted.

Creating the capillary column by adding 40 liters of water in the planting hole

The capillary system with atmospheric humidity is clearly visible on this photo from China – white top soil is dry, dark lower soil is humid

4. The planting

The plant is planted in the planting hole made with the capillary drill.(*****) The Groasis Growboxx is put around the plant to protect it. The opening in the middle of the Growboxx is placed east-west so that the sunlight can enter in the morning and the evening. However, at noon the opening will provide shadow to the little plant. The water in the box absorbs the heat of the sun during the day. It transfers the heat during the cold night to the soil. Figures of the University of Valladolid show that the temperature balancing capacities of the Growboxx are very effective. This ensures that the soil temperature will never be extremely high, nor extremely low. In the same time the box ensures that the sun never directly shines on the soil around the plant, so the top layer will not dry out. This way – by preventing evaporation - the Growboxx keeps the capillary column intact. Of course the plant uses some water to grow. This water is added by the box through its wick. Every day the box adds approximately 100 milliliter of water to the column. With the optimum temperature, the optimum humidity and optimum feeding, the roots start to develop and grow approximately 1 centimeter per day. After one year the tree has its roots 3 to 4 meters deep and grows independent from the Growboxx. The Growboxx starts to degrade and transforms in food for the tree.

(*****)http://www.youtube.com/watch?v=ZvAFzn85g4c&list=PL5MDcgMmY2CWXN3s3e1pxfctPiY1e5oga

Groasis Growboxx with two Pinus saplings planted on rocks

5. Protection

5.1 The Growsafe Telescoprotexx plant protector against light, heat, frost, wind and animals

The biggest challenge in degraded areas after planting is probably the high air temperature. The air is hot, the light intensity unbearable. So we developed a plant cooler. In many countries the winters are hard and with strong winds. Tree saplings die because they dry out. In addition to that, animals are hungry and eat everything that is green and growing. Animals can either be wild or domesticated. Deer, goats, sheep, hares, rabbits and camels are the biggest problem. Growers lose millions of dollars because of this problem. Crops get lost. Young saplings have no chance to survive the first years. The existing solutions are not sufficient to solve these problems. They suffer from several important problems. The problems of the currently existing plant protectors are:

- The plant protectors do not protect against high light intensity and heat in summer
- The plant protectors do not protect against frost in winter
- The plant protectors are not tall enough
- The plant protectors cannot grow with the tree
- If you use a tall protector, over 50 cm high, you need an expensive stick – approximately 2 Euros - to support it
- The plant protectors are sold as a tube, so voluminous and expensive to transport. Therefore they are seldom sold in developing countries as the costprice including transport goes up to over 2 Euros per tube.
- The tubular plant protectors are expensive to produce, so expensive to buy

This tube has all the negative characteristics as described above

After three years of intensive research Groasis has invented a plant cooler that has resolved the described challenges. The commercial name is “Growsafe Telescoprotexx” plant protector.

The Growsafe Telescoprotexx plant protector shields plants successfully:

- The Growsafe standard height is 50 cm
- The Growsafe functions as a telescope. You can flexibly protect your plants to unlimited heights by just adding, fixing and connecting the next tube to it
- The flexible Growsafe does not need a stick to support. The growing tree itself supports the Growsafe
- You buy the Growsafe as a sheet. There are 32,000 sheets on one pallet. The transport costs are therefore low enabling it to export them to developing countries
- The Growsafe is inexpensive to produce. So it can be sold cheap
- Instead of using ventilation to cool down the plant, the Growsafe unique special colour filters the light. Blue and red light, necessary for the photosynthesis, are allowed to enter 100%. The rest of the light waves are filtered out . The light intensity is reduced and the temperature cools down in summer. The plant will grow fast without being stressed by the sun.
- As the Growsafe uses filtering the light and doesn´t use ventilation to cool down the plant, the plant evaporates less in summer. This effect reduces the need for water. In some countries young saplings die during the winter period caused by the extremely cold dry winds. The Growsafe also protects the plant against these winds.
- The Growsafe produces water when there are circumstances with condensation. The water tower function improves the working of the Growboxx and/or Waterboxx.

The Growsafe Telescoprotexx is a flexible inexpensive plant protector that reduces the light intensity, cools down the plant in summer, protects the plant from frost in winter, protects against wind and (sand) storms and protects against grazing animals. With the help of this easy to implement protection, planted trees grow approximately 20% faster to a height high enough to survive without protector.

The flexible height of the Growsafe Telescoprotexx

5.2 Alternative food

In Mother Nature trees never grow alone. They grow in symbiosis with other plants. Animals enter a certain area, then eat the grass and herbs and add some branches to their food to mix. After a few days they leave and go to the next area. The mistake that man makes is that we continuously stay with too many animals in the same place. Growth Balance has developed methods during the last 20 years that copy the principle of Mother Nature. With the Terracedixx and the capillary drill we create places with higher humidity where seed from herbs and grasses – stored in the soil from passed periods - will spontaneously germinate and start to cover the area.

Intelligent grazing can help stimulating the growth of trees – Mother Nature always had trees and animals together in a symbiosis

6. Costs, efficiency and R.O.I.

6.1 Comparing Groasis Technology with drip irrigation

The attached document Appendix 9 demonstrates that the Groasis Technology compared to drip irrigation while used in the first 10 years results in:

1) 7,494 Euros lower costs per hectare
2) 94,81% less water use

Appendices 2 and 3: Comparison costs drip irrigation with Groasis Technology

The water efficiency of 94,81% less use, is maybe the most important characteristics of the Groasis Technology. In most regions with a dense population water stress is now one of the most challenging problems.

6.2 Estimated project costs

One cannot say that "with the Groasis Technology a project will cost this amount". The reasons are the following:

- Labour costs are between 2 (Ethiopia) to 20 Euros (Spain) per hour, depending on the country

- The chosen species influences the costprice per hectare considerably. Pistachio costs 8 Euros for a sound sapling, Moringa costs 1 Euro for a sound sapling
- The plant density, 200 or 1,000 per hectare, plays an important role
- The difficulty to access the area plays an important role
- Etcetera

6.3 Groasis Growboxx costs compared to Groasis Waterboxx

The Waterboxx is sold for 11.99 to 19,99 USD. In the future – when the production has been up scaled - the biodegradable Growboxx will be sold for 1,99 to 2,99 USD.

7. Integrated planting method

The above explanation has shown that the Groasis Technology is an integrated planting methodology to plant trees in dry, eroded or rocky areas. The Groasis Technology is a copy of how Mother Nature plants. Over ten years of research has shown us how to successfully plant in degraded land and wasteland and change these areas into productive land. The survival rate of plants which have been planted with the Groasis Technology is over 90%. The savings on water, energy and costs are significant and impressive. The Groasis Technology is the only sustainable planting technology in the world that can be used on an industrialized scale and that has such a high survival rate. It allows us to reforest the 2 billion hectares of current manmade degraded areas in the coming 50 years, and by doing so generates significant returns for the person or entity that is developing these planting projects.

8. Photos and communication

The photos below demonstrate the incredible possibilities that we have created with the Groasis Technology. We can really reforest the world without using energy and water for drip irrigation. Dutch suppliers can do this at a previously unimaginable costprice. Holland created its own country from the sea. Holland is now able to create productive land from degraded farmland. Groasis has a website www.groasis.com in 5 languages to inform people about the capability of the Groasis Technology. Over 10,000 people visit the website every month. On its YouTube channel, each day over 1,600 visitors watch the educational videos in 11 languages. See https://www.youtube.com/user/Groasiswaterboxx

No 1 Gmelina arborea (Beechwood) on July 4 2012 two months after planting in Ecuador – 8000 joules per day (highest radiation on Earth – temperatures up to + 40,5°C – only 211 mm rain per year)

No 2 Gmelina arborea (Beechwood) on May 24 2013 - thirteen months after planting in Ecuador – without using drip irrigation

No 3 Scalesi helleri tree planted at Charles Darwin Research Station Galapagos in Groasis Waterboxx
May 17 2013 – no fresh water available for planting

No 4 Scalesia helleri tree at Charles Darwin Foundation Galapagos 8 months after planting

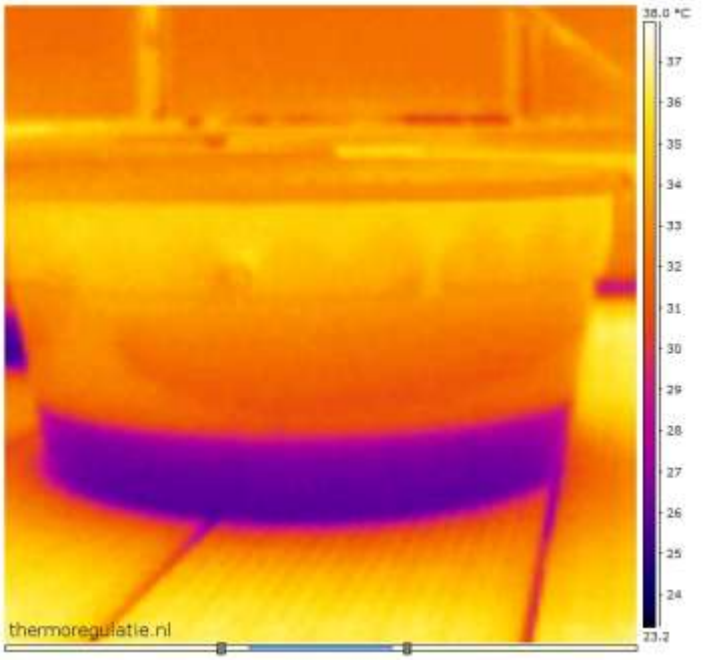
No 5 Plantation in Kuwait – world's hottest place - June 1 – 2012 – left Mr. Khaled Al-Kulaib from Kuwait Oasis and right Mr. Anwar Sarhan from Groasis Middle-East

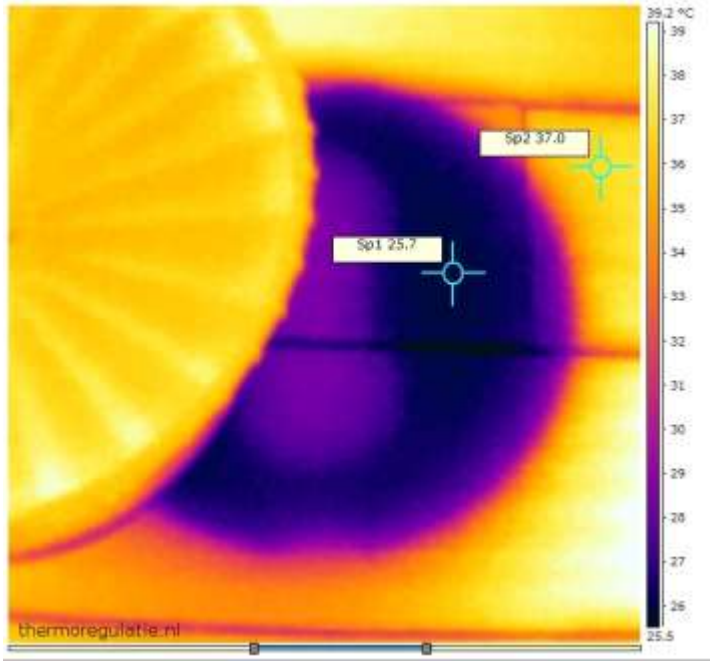
No 6 Trees have grown well in Kuwait without irrigation February 2-2014.

Groasis Waterboxx in Dubai June 2012

Groasis Waterboxx in Dubai sandstorm September 2012 - see the convincing video at http://www.youtube.com/watch?v=jvc1Wm9KKro&list=PLA3430C0E83D992AD

The cooling effects of the Groasis Growboxx made visible with infrared photos





Water turned off in Abu Dhabi desert tree experiment
http://www.greenprophet.com/2014/05/water-turned-off-in-abu-dhabi-desert-tree-experiment-photo/
Planting deserts with drip irrigation is not sustainable. Once the pumps go out, the trees die.

Trees planted in the Kuwait Green Wall Project with the Groasis Waterboxx. After 8 months the Waterboxxes have been removed to plant the next tree. The trees stay alive. The Kuwait Green Wall is a ‘wall’ of trees alongside the 420 kilometers long border of Kuwait.