Innovative products for efficient irrigation and sustainable water resources management

www.chahtech.com
Considering the problems of water in the arid and semi-arid regions in the world, our team, lead by Dr. Bellachheb CHAHBANI (senior scientific researcher specialized in water economy and efficient use of hydraulic resources) spent more than 25 years experimenting new techniques for irrigation and for the injection of retention water or natural sources water to be conserved in the deep soil layers. These researches results are highly innovative products such as The Buried Diffuser and The Draining Floater. These worldwide patented (PCT) inventions were awarded multiple times.

Chahtech SA manufacture and distribute worldwide the different products. The mean objectives of these inventions are:

- Enhance the efficiency of water resources by using less water to produce more food
- Increase the productivity of rain fed agriculture especially rain fed trees
- Make the rain fed agriculture sustainable taking in consideration the irregularity of rainfall
- Conserve Oasis and combat desertification
- Combat soil salinization when the irrigation water contains 3 to 5 grams salts per litter
- ...

...
Chahbani Technologies was created with a high desire to improve the human life. Our core values are driven by an unfailing wish to save water for the next generations, combat famine, combat hunger, combat desertification... Our inventions and commitments were awarded multiple times:

- **The Grand Prize INNOVATEC** 2012/2013, MIFFEL, Avignon, France. 2012
- **TOP 20 Innovative SME of InfoDev**, World Bank, Helsinki, Finland. 2011
- **Maghreb Union Combating Desertification Technologies** Prize. 2007
- **ALECSO Prize** (Arab League of Education, Cultural and Scientific Organization) of scientific innovation in the field of water. 2002
- **Two Silver Medals** for two inventions - 30th International Exhibition of Inventions, Geneva, Switzerland. 2002
- **First Prize of the Tunisian Association of Inventors** for researchers inventors granted by the Tunisian Association of Inventors at the 11th National Competition of Invention and Innovation, Tunisia. 2001
- **First Prize of The WIPO** (World Intellectual Property Organization) for the best invention by an inventor researcher at the 11th National Competition of Invention and Innovation. Tunisia. 2001
- **Mediterranean Prize for Water** award from the Carrefour Euro Mediterranean Water HYDROTOP
- ...
Summary

1 - About

2 - The Buried Diffuser

3 - The Draining Floater

4 - R&D

5 - Services

6 - Contact
The Buried Diffuser is a new underground irrigation technique which can be used for trees (fruit trees, forest trees, ornamental trees) and shrubs, vegetables in fields and in green houses and plants in containers, pots or boxes. The Buried Diffuser is, with no doubt, the most efficient technique to bring water to the roots. In few words, The Buried Diffuser is:

- New solution to save irrigation water, energy, fertilizer, etc.
- 0% waste by evaporation
- 2 times less water than the drip method
- 3 to 5 times more yield than drip irrigation
- Very simple installation and use
- Not expensive
- Innovative with high commercial potential
- Most effective underground irrigation system
- Allows Anticipated Irrigation during the rain period and no irrigation during the dry period
- Allows The injection and the conservation of water in the deep soil layers
We design and manufacture three different Buried Diffusers. Each one has its own technical details which make it the most efficient for its specific uses.

Trees Buried Diffuser

Vegetables Buried Diffuser

Container Plants Diffuser
The Buried Diffuser is, with no doubt, the most suitable irrigation technique to bring water to the tree roots.
The Buried Diffuser

The components of The Buried Diffuser are:
- 1 diffusing part (15x15 or 15x30)
- 1 vertical 16 mm connection pipe (50 cm long)
- 1 water flow regulator (dosing emitter)
- 2 flexible pipes 5 mm (5 till 7 cm long each)
- 1 cork 16 mm
- 1 gasket 5 mm
- 2 connectors 5 mm
- 1 connector 16 mm
The Buried Diffuser

We currently manufacture 2 Trees Buried Diffuser models: The 15x15 Model and The 15x30 Model. The differences between these two diffusers are the size of the diffusing surface and the volume of the diffused water per hour:

- 400 square centimeters for The 15/30 Diffuser. The water volume diffused per hour is 8 litters (maximum).

- 200 square centimeters for The 15/15 Diffuser. The water volume diffused per hour is 4 litters (maximum).

The diffused water amount is regulated by the water flow regulator connected to The Buried Diffuser (delivered in the package) and the water distribution pipe (16 or 20 mm diameter).

The Trees Buried Diffuser can be used for all kind of ornamental trees, forest trees or fruit trees such as banana, mango, papaya, litchi, guava, avocado, ficus indica, pomegranate, date palm, oil palm, apple, apricot, grape, olive, orange, citrus, almond, nut, pear, fig, etc.
The Buried Diffusers are installed in holes, 30 to 60 cm below the topographic soil surface.

It is possible to install The Buried Diffusers in the plantation before the installation of the tree. In this case, The Diffuser should be placed 50 to 70 cm far from the axis of the tree. When the diffusers are added after the trees plantation, they should be installed in the extremities of the canopies.

For the irrigation of shrubs and perennial medicinal or ornamental herbs, The Diffusers are installed in holes 20 to 40 cm deep below the topographic soil surface and 20 cm far from the axis of the plant.
The water coming from the water distribution pipe (16 or 20 mm diameter) cross the water flow regulator. The regulated flow of water (8, 4 or 2 litters per hour) is transferred to the diffusing surface (400 or 200 or 100 cm²) which is in contact with the soil below. This diffusing surface is composed of very porous plastic net retaining 5 mm of siliceous granulate. The irrigation water arriving in this granulates circulate through the macro pores and then infiltrated in the soil below along the diffusing surface.
Burying The Diffuser at 50 cm is valid for all kind of trees. This depth is fixed according to root system distribution in rain fed and in irrigated crops. In both crops, most of the root system (70 till 90%) is located in the first 60/70 cm of the soil. This is related to water availability from irrigation or from rain water infiltration. The second part of the root system (pivot root system, 10 till 30%) is in the soil layers, below 70 cm. This pivot root system is a life strategic system for the tree. It is used when there is no more water in the first 60/70 cm. The tree will “pump” the water, using the pivot system, from soil deeper than 60/70cm. This pivot system can reach a depth of several meters (3 till 10 meters).
The water diffusion is related to soil physical characteristics. In a sandy soil, the diffusion flow is mostly vertical. In this case it is recommended to irrigate more frequent (but 2 times less frequent than drip irrigation). In an equilibrated soil, the diffusion flow is uniform vertically and laterally. In a heavy soil the diffusion flow is more important laterally than vertically.

The Buried Diffuser can be used for more than 30 years without any maintenance.

If the distance between the trees is less than 3 meters, you need only 1 Diffuser per tree. But if the distance between the trees is more than 4 meters, then you need:

- 2 Diffusers, if the tree canopy diameter is less than 2 meters
- 3 Diffusers, if the tree canopy diameter is between 2 and 4 meters
- 4 till 5 Diffusers, if the tree canopy diameter is more than 4 meters
For the installation of Diffusers, holes are dug at the edge of the canopy of the tree or shrub. Each square hole (40x50 cm) or circular hole (35-40 cm) must have a depth of 60 cm.

You put The Buried Diffuser on the bottom of the hole, then you bury it while compacting well the fill. If you want to completely bury all the components of The Buried Diffuser, you should decrease by 10 cm the length of the vertical diffuser’s pipe.

For the water distribution pipe, particularly for canopies more than 5 m, two configurations are possible:

- A first configuration where the pipe is at the soil surface or buried at 10 cm. This concerns as well as the part of the pipe between the trees and the part with the water flow regulator (dosing emitter) along the edge of each canopy.
- A second configuration where the water distribution pipe, is composed of a fixed part (buried at 10 cm or not), with dosing emitters and another removable part after irrigation. Each removable portion is connectable to the fixed parts of two adjacent trees of the same row. This connection is made by two junctions or bends 16 or 20mm. When removing the removable part for storing, you should close the openings of the two ends of the fixed part to avoid the entry of sand into the pipe. This configuration is only valid when you have a deep soil (minimum 1 m under the diffuser), allowing to store enough water for the tree for 2 to 3 months. Thus, the irrigation is realized just 4 or 6 times per year. Each irrigation must be continuous (day and night) and can last one to two weeks.

Click to see Installation videos online
TIPS: If the soil is hard and difficult to dig using a motorized auger or manually, you can set up water dosing emitters connected to the water distribution pipe along the edge of the canopy. You let these dosing emitters discharge water for 10 to 12 hours to moisten the soil where the holes would be dug. This "pre-irrigation" will greatly facilitates digging the hole for the diffuser.

When The Buried Diffuser works with gravity:

- No needed energy
- No CO$^2$ emission
- No maintenance

Gravity (0.2 bar) irrigation of an Olive tree equipped with 3 Buried Diffusers. The water comes from a plastic reservoir of 1000 litters.

The different usual methods to automate the irrigation can be used with The Buried Diffuser. But the simplest way to automate the irrigation without any sophisticated devices or installation is the use of the gravity. Just fill a reservoir and start you irrigation day and night without any energy. When the reservoir is empty, you refill it.
Installing The Buried Diffuser for Almonds Trees - Montpellier (France)

Placing 2 Buried Diffusers for an Almond Tree - Montpellier (France)
The Buried Diffuser

Installing The Buried Diffuser for citrus and orange trees - Beni Khalled (Tunisia)

Young Orange Trees irrigated using Buried Diffusers - Private garden in Djerba (South of Tunisia)
Once The Buried Diffuser is correctly installed, no maintenance is needed.

Installing The Buried Diffuser for Olive trees - Sfax (south of Tunisia)

Adult Olive trees plantation irrigated using Buried Diffusers - North of Tunisia
The Buried Diffuser

Installing Buried Diffusers for Date Palm Trees - Douz Oasis (Tunisian Desert)
Plan view of trees irrigation with Buried Diffusers using gravity water flowing (from a reservoir built on the topographic soil level) and low water pressure (0.1 bar)
The Buried Diffuser for drought and hunger mitigation within climate change conditions

In addition to regular irrigation, The Buried Diffuser can be used for 2 new concepts: The Anticipated Irrigation and The Water Injection in the deep soil layers.

The goal of these new concepts is to save and conserve the huge water quantities received during the wet season, for the next dry season. More than that, in other regions of the world the challenge is higher: how to save and conserve the huge quantities of water received during the wet or rainy years to be used during the long dry period: one till 3 years.

Anticipated Irrigation and Water Injection are tested and approved solutions for drought mitigation and for climate change adaptation.
Anticipated Irrigation

Instead of irrigating during the hot or the dry season, the irrigation using Buried Diffusers is done during the autumn and winter or during the rainy season. The amount of water of the Anticipated Irrigation should cover the total need of the crop during the hot or dry season (spring and summer). This water amount is stored in the deep soil layers and will be used by the deep or sub surface roots systems of the crops.

Water injection in the deep soil layers

The water injection in the deep soil layers is useful especially for trees crops. The injected water comes from dams, rivers, and springs.

The amount of the injected water could cover the need of the trees for several years (2 to 3 years) when the soil below 50 cm is thick (1 meter or more). This injected water is conserved (stored) in the deep soil layers (50 cm below the soil surface) and used later by the deep root systems of the trees during a long drought period: six months till 3 years. **During the drought period, trees produce normally using the injected and stored water.**

For long injection period (15 days to 90 days none stop: days and nights), it is recommended to use our energy less system of water pumping and distribution: The Draining Floater.
The Buried Diffuser

<table>
<thead>
<tr>
<th></th>
<th>Rainfall during normal year 300 mm</th>
<th>Rainfall during rainy year 300 mm</th>
<th>Rainfall during normal year 600 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Runoff</td>
<td>60 mm (20%)</td>
<td>155 mm (33%)</td>
<td>200 mm (66%)</td>
</tr>
<tr>
<td>Potential water to be stored</td>
<td>420 000 Cubic meters</td>
<td>1 050 000 Cubic meters</td>
<td>1 400 000 Cubic meters</td>
</tr>
<tr>
<td>Effective stored water</td>
<td>420 000</td>
<td>450 000</td>
<td>450 000</td>
</tr>
<tr>
<td>Lost water</td>
<td>0</td>
<td>600 000</td>
<td>950 000</td>
</tr>
</tbody>
</table>

Data for a hill lake with watershed covering 700 hectares and 300 000 Cubic meters as retention capacity

- The lost water during 1 rainy and 1 very rainy year is 1 550 000 Cubic meters
- This volume can be injected and stored in deep layers of the soil using The Buried Diffuser
- The injection of 1 550 000 Cubic meters is sufficient to maintain in good conditions of production 34 444 adult olive trees during 3 dry years (each tree has 15 Cubic meters per year)
During 2012, the north of Tunisia got exceptional heavy rains. This generated catastrophic floods in many cities. The water flow of Medjerda River reached 300 cubic meters per second during 10 days (none stop). According to this flow **10 800 000 cubic meters have been evacuated to the Mediterranean Sea.**

This big amount of lost water, if injected in the deep soil layers of the plantations, is sufficient to maintain **540 000 adult olive trees in good production conditions during 3 successive dry years.**

The water flowing from the natural springs and not used during the autumn, winter and the beginning of spring is lost in the rivers. This lost water is estimated to **23 328 m³** (from September till May) for a spring with a flow of 1 litter/second.

If this volume is injected in the soil horizons, using Buried Diffusers, it is sufficient for the water needs of about **518 adult olive trees during 3 dry years** (without any rain).
On February 2013 Chahtech started 2 trials in the field of a farmer in Nouvelle Matmata (arid region in the south of Tunisia).

The first trial includes the installation of 2 Buried Diffusers (15x15 model) for 2 olive trees suffering from long drought (75% of the leaves are dried). 2 Months later (April 2013), the 2 irrigated trees become green with new leaves and young branches. The irrigations water given to each tree is sufficient for 4 months.
The second trial is the injection of 10 m³ of water in the deep soil layers (below The Buried Diffuser) using only one Buried Diffuser (15x30 model). The irrigation duration is 52 continuous days; no stop (24/24 hours, 7/7 days).

The excavation of a trench (6 meters long and 4 meters deep) to discover the wetted area of the deep soil layers below The Buried Diffuser which injected 10 000 litters showed the wetted area result of the injection of 10000 litters has 6 meters diameter and 2 meters deep.
Installation of Buried Diffusers for spring's water injection (stored in a concrete reservoir) in the deep soil layers of figs' trees plantation - Djebba (North West of Tunisia)
Vegetables Buried Diffuser

3 to 5 more crop yields using the same water amount.
The components of The Buried Diffuser are:

- 1 diffusing part (15x15 or 15x30)
- 1 vertical 16 mm connection pipe (10 cm long)
- 1 water flow regulator (emitter)
- 2 flexible pipes 5mm (5 till 7 cm long each)
- 1 cork 16 mm
- 1 gasket 5 mm
- 2 connectors 5 mm
- 1 connector 16 mm

For the Irrigation of vegetables in fields and in green houses, The Buried Diffusers are installed about 3 cm far from the axis of the plant and 5 to 10 cm deep below the topographic soil surface.
We currently manufacture 2 Vegetables Buried Diffuser models: The 15x15 Model and The 15x30 Model. The differences between these two diffusers are the size of the diffusing surface and the volume of the diffused water per hour:

- 400 square centimeters for The 15x30 Diffuser. The water volume diffused per hour is 4 litters (maximum)
- 200 square centimeters for The 15x15 Diffuser. The water volume diffused per hour is 2 litters (maximum)

The diffused water amount is regulated by the water flow regulator (dosing emitter) connected to The Buried Diffuser (delivered in the package) and the water distribution pipe (16 or 20 mm diameter).
After preparing the soil, we dig ditches with a depth of 10 cm and a width of 40 cm. Once diffusers are set up in ditches, we bury them with a good compaction of the backfill. Then one carries out the connection of the teat of The Diffuser with its seal (3/6mm) to the water distribution pipe (16 or 20mm which can serve 2 rows of diffusers.)
The Buried Diffuser can be used on many vegetables such as pimentos, melon, watermelon, cucumber, tomatoes, marrow, courgette, gumbo, potatoes. The Buried Diffuser is not advised to be used for carrot, persil, spinach, floss, onion, garlic.
The Buried Diffuser reduces diseases because there is no wetted soil and no weeds. In greenhouses, since there is no water evaporation from The Buried Diffuser, water vapor in the atmosphere is considerably decreased. This reduces the appearance and propagation of diseases such as mildew.

This low rate of water vapor inside the greenhouses, facilitates the movement of pollen and increase the rate of flowers producing fruits.
Trial results of comparison of irrigation by drip and by Buried Diffusers in the greenhouse of farmer field in Region Maatoug (Desert of south of Tunisia)

<table>
<thead>
<tr>
<th>Irrigation technique</th>
<th>Volume of irrigation water per plant (in liter)</th>
<th>Total production in for 112 plants (in kilograms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buried Diffuser</td>
<td>500</td>
<td>716</td>
</tr>
<tr>
<td>Drip</td>
<td>500</td>
<td>141</td>
</tr>
<tr>
<td>Buried Diffuser</td>
<td>250</td>
<td>382</td>
</tr>
<tr>
<td>Drip</td>
<td>250</td>
<td>103</td>
</tr>
</tbody>
</table>

The Buried Diffuser produces 3 to 5 times more yield than the drip method.
The Buried Diffuser is recommended for organic farming because it reduces weeds and diseases development. This helps a better growth of the plants without using herbicides, pesticides and other chemical products.

Using Buried Diffusers to irrigate plants in containers in nurseries outside or in green houses
Plan view of vegetables irrigation with Buried Diffusers using gravity water flowing (from a reservoir built on the topographic soil level) and low water pressure (0.1 bar).
Container Plants Buried Diffuser

You go on vacation and nobody can come to water your plants? You are environment friendly and want to save water? You want to use less herbicides? You want healthy plants? You want to reduce the frequency of irrigations?...
The Buried Diffuser with mini reservoir for pots and containers has a diameter of 30 cm. It can be used in pots or containers with a diameter or side larger than 30 cm. The capacity of the mini reservoir of The pot Buried Diffuser is 120 cl.

The Buried Diffuser (with reservoir) for plants in containers, pots and boxes can be used indoor or outdoor for ornamental plants and vegetables in administration, houses, nurseries...
The Diffusers are sold in pairs. Their putting-in in pots and containers is realized as follow:

1. Fill the pot by the soil (or other substrates) until 10 cm below the edge of the pot or container
2. Place The Diffusers on the ground where we will put the plant
3. Mark the location of the plants and remove The Diffusers
4. Dig holes in these locations and put the plants
5. Tamp the soil around the plants
6. Put the couple of Diffusers
7. Finally bury The Diffusers until their level cap.
The Buried Diffuser

The diffusers include small water reservoirs to be filled during the irrigation. For the first use, the Diffuser will irrigate until the soil (contained in the containers, boxes or pots) is completely wetted. The moisture of the container soil, after the irrigation using the diffusers, is sufficient for several days or weeks.

The duration between 2 irrigations is at least 3 times longer than the existing irritation irrigation methods (capillarity, surface, dripping...).

The Buried Diffusers for containers can also be used to produce vegetables in the balcony of apartments or individual houses.
Different ornamental plants in containers irrigated with Buried Diffuser with reservoir indoor and outdoor.
The Buried Diffuser with reservoir for pot reduces the irrigation frequency: Only one irrigation per month instead of one irrigation every week.

Evolution of water amounts in ornamental plants containers irrigated with surface irrigation, drip and buried diffuser, outdoor on the roof of a building – Medenine (South of Tunisia)
An important reduction of the number of irrigations: This is a result of water saving which prolongs the duration between two irrigations. This was confirmed by the comparison of irrigation of ornamental plants in containers using surface irrigation and Buried Diffusers. The results of this trial show:

- After 2 months, the water content in the containers irrigated by Buried Diffusers is 89% and 91%. For the surface irrigation the values are respectively 51% and 54%.
- After 4 months, the water content in the containers is 22,6% and 20,6% for the surface irrigation and 81% and 84% for The Buried Diffuser.

This means that in a programmed irrigation, when the water content in the containers reaches 50% of the field capacity, the periodicity of irrigation is 2 months for the surface irrigation and 6 months for the Buried Diffuser.
All Buried Diffusers are highly recommended for landscaping. The benefits are huge:

- Water saving
- Energy saving (can be automated using gravity)
- Better look (pipelines are buried)
- No weeds
- ...

The Buried Diffuser
Advantages of The Buried Diffuser
Substantial water saving
The water saving reaches 100% (0% evaporation), thus the irrigation frequency is considerably reduced. The Buried Diffuser uses only 30% of the water amount used by drip irrigation to produce the same weight of crop. Because water losses due to evaporation, deep percolation and runoff are minimized.

The comparison of Buried Diffuser with surface and drip irrigation, during 2 months of summer 2012, demonstrates the superiority of the diffuser in water conservation. 61 days after the irrigation, The Buried Diffuser allowed to conserve 34 % of the initial irrigation water amount when the surface irrigation allowed only 3,4% and the drip irrigation allowed 8%.

Healthier and better quality crops
Soil and foliage are kept dry, reducing fungal diseases caused by surface or overhead irrigation. Eliminates fruit and vegetable spotting.

Higher yields
Water and nutrients delivered directly to the root zone promote healthy plant growth and reduce plant stress.

Improved soil aeration
Fine soil particles are not washed down, decreasing soil compaction and improving root growth.
Important reduction of labor for the maintenance of soil

Less weeds pulling out, less irrigation frequency, less mulching actions, easier fertilizer application, less weed and disease control and less maintenance, which means less handling.

Longer life for water distribution pipes

All the network could be totally buried (20 cm below the topographic surface). Less animal, human, sun or mechanical damage. The irrigation water distribution network of The Buried Diffusers could be totally buried (20 cm below the topographic surface). This avoids the damages caused by animals (dogs, foxes etc.) or human beings.

Important Energy saving

The pumping time is less important because of the reduction of needed irrigation water. In addition to that the energy saving is higher when the diffuser works with gravity. In addition of using conventional pressure (1-2 bars). The Buried Diffuser operates at low pressure (0.02 - 0,2 bar). The water comes from a simple barrel or tank (100 - 5000 liters) placed on the soil surface. In this case the irrigation is done by gravity and does not need pumping. This induces important energy saving.

Important reduction of fertilizers amounts

Less degradation of the fertilizers and less loss by leaching. Fertilizers are directly delivered to the roots. Reduced nutrient amounts without yield reduction.
An important reduction of number of irrigations

This is a result of water saving which prolongs the duration between two irrigations. For trees plantations irrigated with Buried Diffusers, if the soil (below 50 cm deep) is thick (1 meter or more) and has minimum 10% clay, the irrigation is once per month (12 irrigations per year) or one per 3 months (4 irrigations per year).

Important reduction of soil salinization

When using salty irrigation water (3 to 5 grams salt per litter), this reduction is estimated to 9000 kilograms per year and per hectare (with irrigation volume of 10000 cubic meters with 3 grams per litters salts, 3000 cubic meters of the volume are evaporated).

Less water distribution pipes lines

Only one pipeline is needed instead of 2 or 4 pipelines for drip irrigation.

Important reduction of Herbicides and pesticides

No weeds for vegetable fields and trees plantations, this is a great contribution in the protection of the environment.

Better Look

The irrigation water distribution network could be totally buried (20 cm below the topographic surface) when using Buried Diffusers.
You can measure the superiority of The Buried Diffuser compared to all other irritation irrigation systems by doing a simple trial (with one or many trees of the same size) with 4 plots.

- In the first plot, trees irrigated with The Buried Diffuser.
- In the second plot, trees irrigated with another irrigation technique.

The first and the second plot have to be irrigated with the same water volume (V) during a year.

- In a third plot, trees irrigated with 30% of water volume (V) using The Buried Diffuser.
- In a forth plot, trees irrigated with 30% of water volume (V) using another technique.

After the harvest you compare the yield in the different plots.
The Draining Floater

- Pump and distribute water without any energy
- No CO\textsubscript{2} emission
- No maintenance cost
- Easy installation and use
- Different models for different uses
- Worldwide patented Technology (PCT)
- ...

Gravity pumping and distribution of the natural spring’s water and rivers, the retention water of the hill lakes, dams and other similar (small sized) runoff water retention managements.
The draining floater allows to «pump» and to distribute the water using the gravity. It uses the siphon principle. This principle works with an inversed «U» shaped pipe. This siphon pipe has a section with orifice immersed in the water of the reservoir to be emptied. The second section connected with the atmosphere. This second section (connected to water flowing regulation tap) should be 2 times longer than the first one.

The first section is connected to a draining floater allowing the filtration of the “pumped” water. This draining floater is always floating even when the water level decreases. A second tap is connected to the siphon pipe in continuity with the vertical part of the second section. This tap is used to prime the “pumping” by filling the second section of the siphon through the orifice of the second tap (Siphon priming tap). When this section is filled the Siphon priming tap is closed.

To begin the pumping and the distribution of the water using the gravity, the “Water flowing regulation tap” is opened and the water is pumped and distributed continuously without any intervention. The “Water flowing regulation tap” could be closed and opened at any time without priming the siphon.
Schematic design of river’s water pumping and distribution using The Draining Floater

System of draining floater for drawing and distributing the Water stored in the traditional tanks
The Draining Floater

Big sized draining floater for big dams and rivers

Small sized draining floater for small water rain water storage concrete reservoirs

Middle sized Draining Floater for middle dams (1000 till 10000 cubic meters)
Installation and setting up The Draining Floater in a hill lake – Sidi Bouzid (center of Tunisia)
The Draining Floater installed for natural springs – Bejaia (Algeria)
Our R&D team is preparing new innovative products (available in 2014):

- Mini Buried Diffuser for landscaping
- Crops Buried Diffuser (corn, sunflower, wheat, millet, sorghum…)
- Different sizes of The potted plant Buried Diffuser
- Complete ready-for-use gravity irrigation system for vegetables and landscaping
- Special pots with draining system
- …
Our experts team can study any need and establish a concrete short, mid and long-term plan in order to achieve goals. Here is some examples of needs in which we can build appropriate strategies based on the use of The Buried Diffuser and/or The Draining Floater:

- A better water management (efficiency, productivity, economy, saving...)
- A friendly environment irrigation (responsible water consumption)
- An ultimate technique to combat desertification
- A sustainable agriculture (irrigated and rain fed) although the climate change and the droughts.
- An intelligent and easy way to combat hunger and famine, poverty and food scarcity...

We offer support to all our customers in how to make the best use of The Buried Diffuser and/or The Draining Floater. According to the nature of the soil, the age of your trees and plants... we define the use conditions (irrigation frequencies, water quantity...). Chahbani Technologies gives you all the tips and information in order to measure the effectiveness of your irrigation network. This effectiveness can be measured for a short, mid or long-term period. We guarantee to our customers an actual concrete effectiveness in less than one year (In most case, our customers notice an important ROI in about 6 months).
Summary

1 - About

2 - The Buried Diffuser

3 - The Draining Floater

4 - R&D

5 - Services

6 - Contact
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