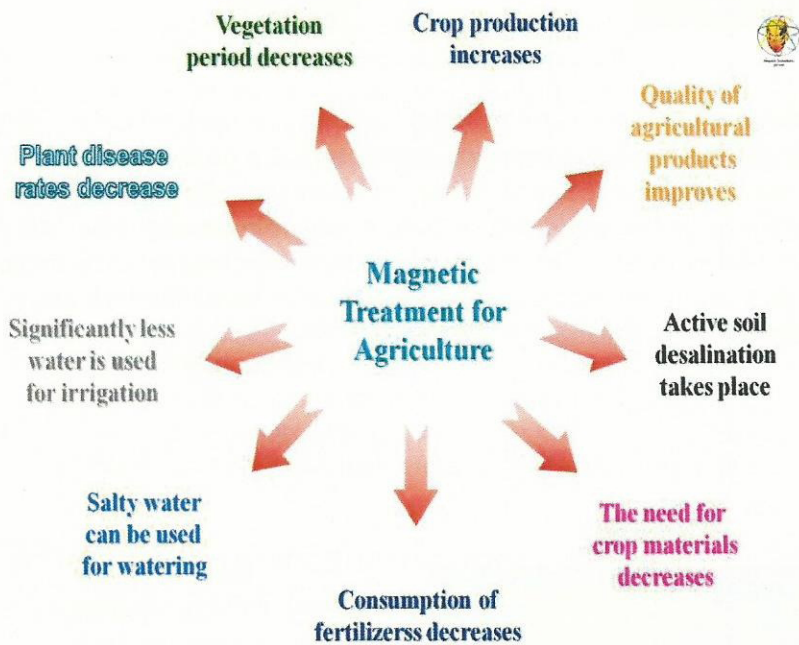


2014



# Magnetic Treatment in Agriculture



MagTech (Pvt.) Ltd., Karachi - Pakistan, principal representative of Magnetic Technologies LLC. - UAE

Agriculture[MT doc v16]

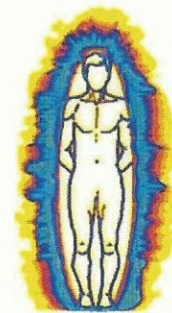
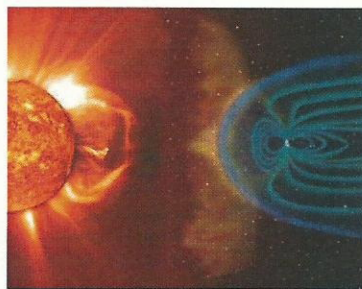
6/28/2014



**Introduction:**

Many written scientific works of biologists and biophysics describe the effect of magnetic fields on plants. Based on these works, "Magnetic Technologies" company came up with a method of magneto-hydro dynamical activation of natural waters and devices used for this method. This method is an essential part in the whole complex of using magnetic fields in agriculture. It includes physical- chemical changes of natural water parameters, resulting in improvement of filtration properties and in an increase of dissolving properties of water. These changes result in an increased ability of soil to get rid of salts and results in a better assimilation of nutrients and fertilizer in plants during the vegetation period.

It is known that plants and trees need mineral salts and microelements from the soil to function and photosynthesize properly. However, plants do not use the majority of nutrients that are in soil. While watering plants with normal water, only a small amount of nutritional elements dissolves in the soil and becomes available to the plants. Further consumption of these nutrients from the soil is very rare when plants start to grow and a larger amount of nutrients is required, the deficit of microelements results in low numbers of crop. The deficit of microelements/nutrients in the soil is the main reason for a decreased growth rate and low crop. That is the reason to why magnetic water should be used for irrigation.



Magnetism surrounds us in our everyday lives. It is the earth's natural defence mechanism to the extremes of the sun and outer space bombardments of numerous types of cosmic rays. On earth Magnetism is the natural enhancement agent of our most precious resource water, constantly realigning the molecular structure after interferences and recycling since the world began. But not only the flowing water we drink and irrigate with, but also within our bodies of all living creatures. We within Magnetic Technologies understand this process and enhance and target the process to the benefit us humans, livestock and of our environment and the needs of the water resource industry.

**MT Outreach:**

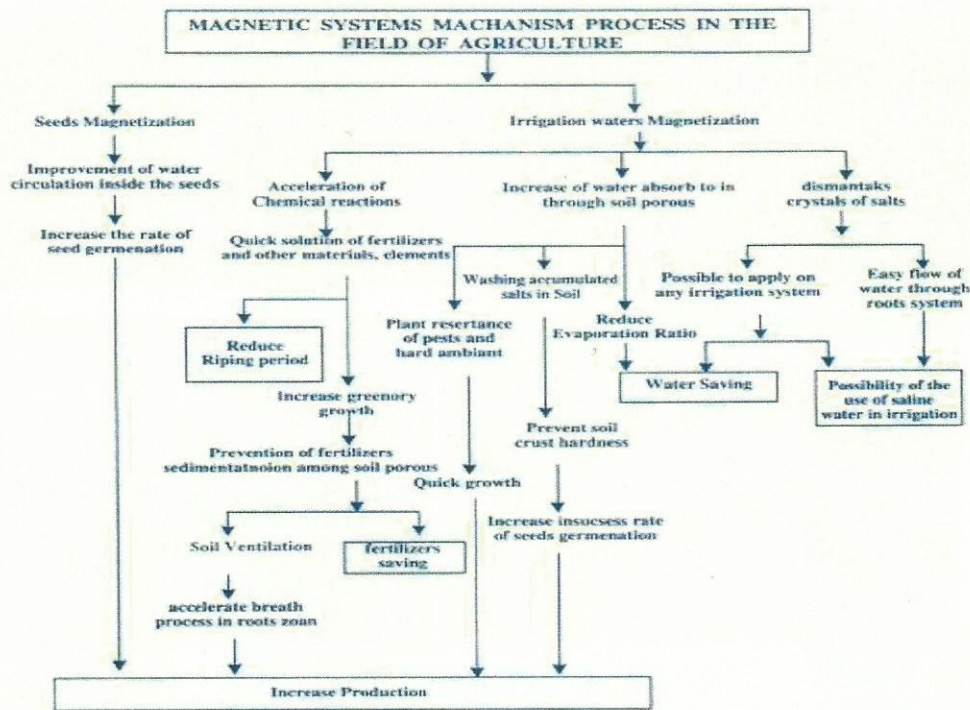
- Water Types:**
- Fresh/ sweet Water
  - Saline Ground Water
  - Hard/soft Water
  - TSE Water
  - Grey Water



- Ground Types:**
- Fertile Agriculture
  - Arid Land
  - Greenhouses
  - Hydroponics
  - Gardens/ Amenity

• Active research, development and use  
 • Active use of our equipment  
 • Reports on use of our equipment





## Defining Water Quality

The long practice of preferencing the water with different mineralization rate for irrigation has produced the evidence that it is insufficient to define the quality of water by the sediment values only. It is expedient that the quality of water be measured by several methods including:

- the Irrigation Factor [IF]
- sodium percentage content [SP]
- relative potential sodium absorption rate [SAR]
- magnesium percentage content [MP] sodium carbonate and bicarbonate content
- and Chloride content danger

Notwithstanding an evaluation method of water quality, the following factors will be critical in determining an agricultural application:

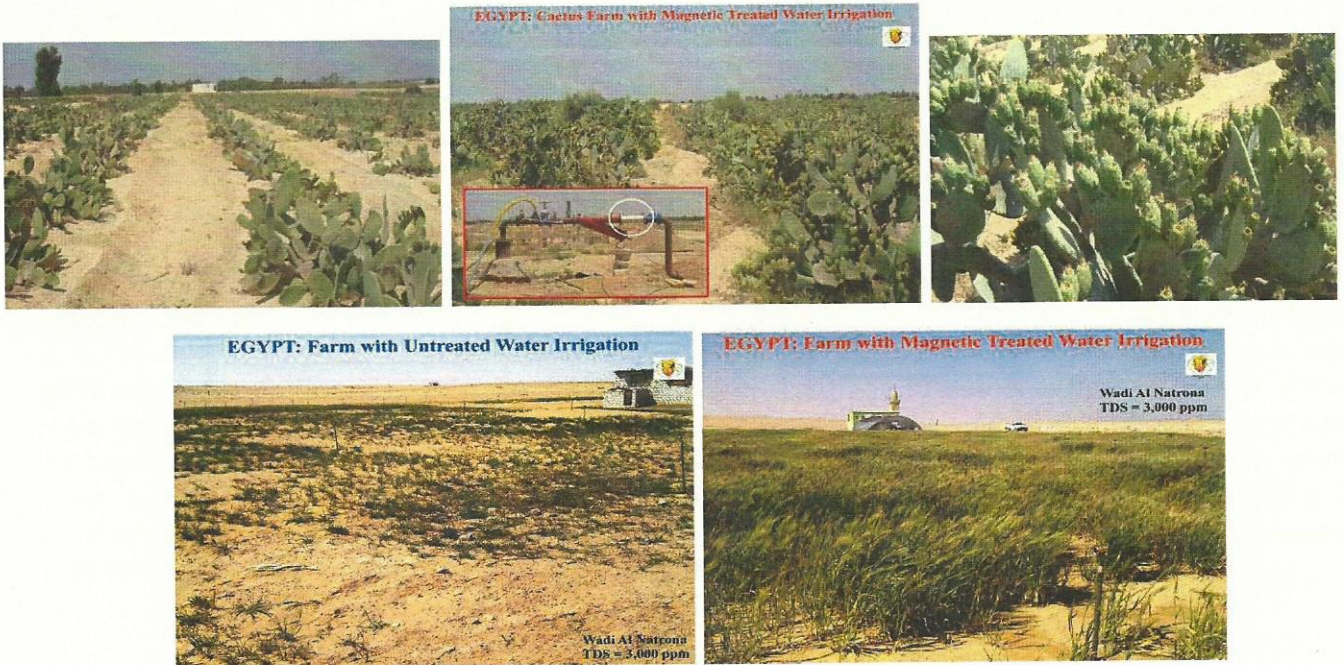
- water and physical properties of the soil
- degree and nature of salinization
- spoil draining degree
- depth , mineralisation and chemical composition of ground waters
- level of rainfalls
- standards, mode and method of irrigation
- salt resistance of crops

Utilization of mineralised waters requires profound scrutiny for specific natural and economic conditions

## Advantages of Magnetisation:

- Vegetation period decreases by 15-20 days, therefore the crops ripe 15-20 days earlier than normally.
- Crop production increases from 15-20% to 100%, and in some cases, even more.
- Plant disease rates drastically decrease.
- Taste of agricultural products improves.
- Approximately 30% less water is used for irrigation
- Therefore 30% less energy is used in water pipes.
- Sea water (salty water) can be used for watering (from 6-8 thousand PPM inclusive) and for some cultures, very salty water can be used (from 15 thousand inclusive).
- By magnetizing seeds before sowing and by irrigating them with magnetic water, the need for crop material decreases by min. 30%.
- Average of 30% decrease in fertilizer consumption.
- Active soil desalination takes place, increasing crop production year after year.





### Range of Magnetic applications within Agriculture:

[outside of agriculture MT has over 50 industrial & associated sector applications]

- Seeds: enhanced germination
- Wheat: irrigation systems enhancing crop yield, robustness and growth cycle
- Chicken: enhanced productivity and reduced mortality and increased taste
- Dairy: increases milk production
- Livestock: increases meat production, taste and appearance
- Fertilizer: Improved process, reduction of odours, enhanced benefits
- Fisheries: enhanced productivity, lower mortality,
- Pollution: Water enhancement with water storage, rivers and streams
- Softens water: reducing required detergents and soaps and
- Infrastructure: Reduces scaling in pipes and boilers and appliances
- Fuel: fuel reduction and emissions reduction for farm machinery and long distance haulage 10-15%
- Environment: Holistic approach improves ecology and well being for plants and animals

### Types of Agriculture Land MT will enhance:

- Fertile rain enhanced open land [ seeds and dry season irrigation and spray on systems]
- Arid dry land [ Irrigation systems and rain catchment facilities and spray on systems]
- Green houses / Poly Tunnels [ irrigation systems drip feed/ micro spray]
- Hydroponics [ water enhancement/ micro spray]
- Gardens & Public amenities [ irrigation feeds and spray systems]
- Nursery potted plants [irrigation soak and sprays systems]

Water Feeds + Pesticide + Fertilizer enhancements

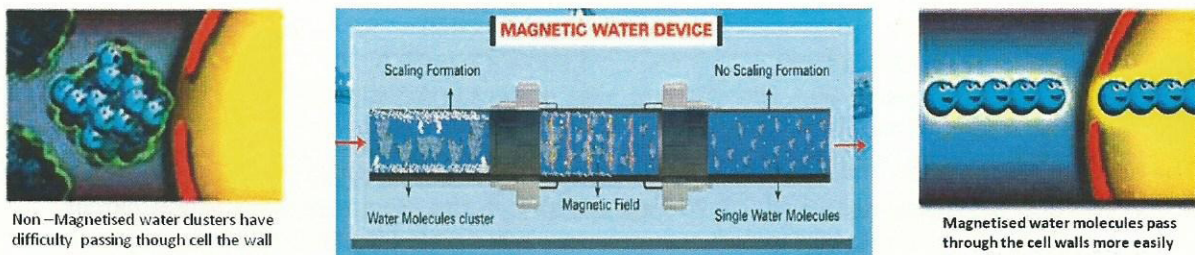


## The Scientists & Technology background:

Russian technology developed through 50 institutes with over 500 scientists during the 70's and 80's latterly under the leadership of Prof Yuri Tkatchenko. During the early 90's the Professor relocated a small science management team to the UAE and created a long term partnership and the Magnetic Technologies LLC with Sheikh Junaid Khoory. During the past 20 years further research and development continued along with expansion into the global market place, with over 50 different applications into various industries and the environment.

The technology base not only addresses land based solutions but also weather modification and atmospheric influencing technology, dissipating air pollution over cities, enhancing rainfall, shielding from sand storms and protecting from fog.

## The Principle of the Magnetic Water Treatment for Agriculture:



Water molecules, due to activity 'interference', lose their polarity charge and then naturally cluster, retaining and suspending pollution particles, restricting the plants and animals from efficiently absorbing the water through their cells. Magnetising water reverts the molecule distribution evenly, recharging the molecules, allowing water to be used more efficiently, lessening required intakes, maximising nutrient absorption.

### Some changes of water properties as a result of magnetic treatment are acceleration of:

- Viscosity by 3-4%
- Surface Tension by 10-13%
- Electric Conductivity by 7-26%
- Specific Heat Capacity by 3-4%
- Latent Heat by 10-40%
- Magnetic Susceptibility by 200-400%

Some changes in operational requirements:

- reduced and potential elimination of chemical and additives reliance
- reduced maintenance and deterioration of filtration and irrigation systems

### Positive effects of treating irrigation source water supplies:

Lakes, Rivers, Sea Lagoons, Ponds Including Fresh Water, Ground Water & TSE Expectations  
After treatment the following changes occur:

- renewal of natural biological processes
- improvement of water biosphere
- elimination of bad odours and Mosquito infestations
- improves the fish habitat and their development
- improves ecology in the surrounding area for insects, birds and plant life



Example of Installations:



Economic Effect Of Magnetic Treatment

example:

State purchase price per 1 ton of wheat, USD		\$	469
Cost of magnetic device 'A 600', USD		\$	4,600
RESULT, ton/plot	$315 - 244 =$	\$	71
PROFIT, USD/plot	$71 \times 469 =$	\$	33,299
PAYBACK PERIOD, seasons	$4,600 \div 33,299 =$		0.138
NET PROFIT at first season, USD/plot	$33,299 - 4,600 =$	\$	28,699

The economic advantage of using magnetic water for irrigating the crops:

- Vegetation period decreases by 15-20 days, therefore the crops ripe 15-20 days earlier than normally.
- Crop production increases from 15-20% to 100%, and in some cases, even more.
- Plant disease rates drastically decrease.
- Taste of agricultural products improves.
- Approximately 30% less water is used for irrigation
- Sea water (salty water) can be used for watering (from 6-8 thousand PPM inclusive) and for some cultures, very salty water can be used (from 15 thousand inclusive).
- By magnetizing seeds before sowing and by irrigating them with magnetic water, the need for crop material decreases by min. 30%.
- Average of 30% decrease in fertilizer consumption.
- Active soil desalination takes place, increasing crop production year after year.

Irrigation Lakes & Tanked Supplies

Golf courses, Parks, Hotels and Malls and Amenity Gardens



By magnetising the flow of waters into and from irrigation sources it has been demonstrated that there can be significant enhancement of grown plant life;

- increasing resilience to disease;
- reducing affects of extreme temperature;
- requiring reduced fertizers, pesticides, herbicides and chemical additives;
- improving appearance, yields, taste and crop production cycles;
- reduces the individual water requirement of plants , trees and grasses;
- dissolves saline and mineral crustation within the soil and infrastructure;
- Transforms TSE waters to environmentally acceptable standards

This is in addition to the improvement of the stored water, removing algae and suspended sediments and odours



International Scientific and Field Reports:

- Uzbekistan Research:

**Excerpt from Report of the Water Problem Institute at the Science Academy of the Republic of the Uzbekistan on Applications of Magnetic Technologies for Irrigation of Cotton Plants**




Sub-plot 1: Irrigated by magnetic water	Sub-plot 2: Irrigated by usual water
<b>+ 30</b> <b>- (10-12)</b> <b>22 - 24</b> <b>3.2</b>	Height, cm Ripen, days Cotton balls per plant Yield, t/ha
	12 - 14 2.0

Heading from the foregoing, it can be seen that the one-year testing of the magnetic system for irrigation of cotton plants has proved to be extremely efficient. Furthermore, the said magnetic equipment required neither technical maintenance nor special training to handle it for the operation period.


It is quite natural that a broad range of magnetic applications as suggested by Magnetic Technologies LLC (UAE) should considerably enhance the capacities of irrigation farming.

- Libya Field Application


LIBYA: wheat field with center pivot irrigation



315 - 318 t  
200 - 244 t



170 cm  
100 cm



20 - 22  
10 - 12

- UAE Farm demonstration



Magnetic water



Control

As can be seen on photographs, when irrigating with magnetic water, not only growth rate changes but the colour of the soil.



- India University reports:

**Rajendra Agricultural University, Pusa, India  
2011, Kharif Season**

Crop	NW	MW (%)	NW+F	MW+F (%)
Palak	0.650	1.200 (84.6)	1.150	1.600 (39.1)
Cabbage	3.250	4.100 (26.1)	3.900	4.905 (29.3)
Cauliflower	3.050	3.900 (27.9)	3.750	4.850 (29.3)
French Bean	0.350	0.670 (91.4)	0.650	0.895 (37.7)
Chili's	0.100	0.375 (375)	0.350	0.450 (28.6)
Brinjal	1.750	2.200 (14.3)	2.100	2.890 (37.6)
Wheat	1.050	1.500 (42.9)	1.450	1.850 (27.6)
Maize	0.220	0.400 (81.8)	0.505	0.700 (38.6)

**Rajendra Agricultural University, Pusa, India  
2011, Rabi Season**

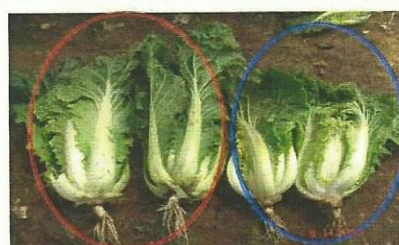
Crop	NW	MW (%)	NW+F	MW+F (%)
Rajma	0.150	0.405 (170)	0.370	0.516 (39.5)
Palak	0.675	1.150 (70.4)	1.145	1.575 (37.5)
Cow Pea	0.250	0.570 (128)	0.550	0.790 (43.6)
Cabbage	3.300	4.200 (27.3)	3.950	4.900 (24.3)
Brinjal	1.650	2.100 (27.3)	2.225	2.900 (30.3)
Bhindi	1.400	2.000 (42.9)	1.900	2.750 (44.7)
Rice	0.100	0.450 (350)	0.425	0.625 (47.1)
Maize	0.150	0.550 (267)	0.475	0.700 (47.3)

- Eritrea Research report:

**ERITREA: Evaluation of Magnetic Technology for  
Cabbage Production**



	Magnetic			Control		
	Max	Min	Average	Max	Min	Average
Weight	1.9kg	1.2kg	1.7kg	1.1kg	0.7kg	0.98kg
Main Root Length, cm	5.8cm	3.4cm	4.53cm	5cm	3.2cm	4.03cm
Total Root Length, cm	25cm	12.1cm	16.1cm	16.2cm	10.8cm	12.65cm





• UAE Direct Applications into Farms:

Khaleej Times, Saturday, December 4, 2004 HOME/REGION 11



Magnetic technology helps increase agri production, and (right) magnetic technology corners device at an Ajman farm. — KT photos by Shasib Amer

## MAGNETIC TECHNOLOGY INTRODUCED IN MORE THAN 20 FARMS IN AJMAN

# Agri production gets a big boost

**By Afkar Abdallah**

**AJMAN** — Magnetic technology was introduced in more than 20 farms as well as gardens in residential complexes in various areas in Ajman to enhance their production and boost civic body's efforts to beautify the emirate and spread greenery.

This technology helps treat water and seeds, increase productivity, enrich the taste of fruits as well as enhance milk and egg production by decreasing illness and death rates of cattle and poultry.

Speaking to Khaleej Times, Mubarak Abbas Mohamed, head of the Agriculture Section of Dubai-based Magnetic Technology Corner company, which installed the systems in agricultural and animal farms in the emirate, said the company is fixing magnetic devices in the irrigation pipes in which the water goes through magnetic field that makes physical-chemical changes in natural water parameters, resulting in improvement of filtration properties and in increasing

increase the ability of soil to get rid of extra salts and result in a better assimilation of nutrients and fertilizer in plants during the vegetation period. "It is known that plants and trees need mineral salts and microelements from the soil to function properly," he said.

However, plants do not use the majority of nutrients that are in soil. While watering plants with normal water, only a small amount of nutritional elements dissolve in the soil and feed the plants. Further consumption of these nutrients from the soil is very rare when plants start to grow and a larger amount of nutrients is required, the deficit of microelements affects the crops, thus underlining the importance of using magnetic water for irrigation.

Dr Abdullah Al Khateeb, head of the veterinary section of the company, said the application of magnetic water in animal-breeding allows the accumulation of protein and not fats in animals' bodies.

"This water should also be used for hygienic cleaning of buildings where animals live," he added.

Saif Salim Al Matroushi, Director of Events Ceremonies Section of Ajman Amiri Court and owner of Agricultural and Animal Farm in Al Helaiwa District in Ajman, said that he decided to introduce the magnetic system in his farm where trees were growing very slowly which resulted in low production. But after the introduction of this technology, he observed improvement in the trees.

He said that he installed three magnetic devices for the fruit trees, landscaping and animals in the farm.

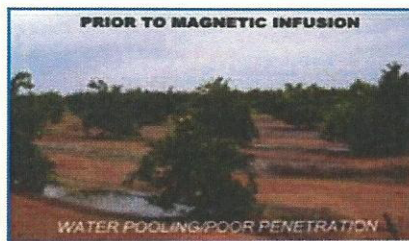
Hamaid Al Matroushi, another owner of a farm in Ajman, said the usage of technology in his farm has increased the milk and egg production substantially. The changes were also witnessed in the size and colour of the fruits in his farm.

He pointed out that this technology is not only good for agricultural treatment but also for human health as it treated various kind of diseases.

*The magnetic technology helps treat water and seeds, increase productivity, enrich the taste of fruits as well as enhance milk and egg production.*

• Australia Field Applications:

**Farm 1986**  
**Lake Wyangan, NSW 2680, Australia**  
**Ph. 02 6963-4822 Fax 02 6963 4829**  
**violi-estates@bigpond.com**



	UNMAGNETIZED	MAGNETIZED
VINEYARD MAIN LINE RUNNING PRESSURES (kPa)	420	480
VINEYARD MAIN LINE VOLUMES (m <sup>3</sup> /hr)	520	570
DRAW OF CURRENT ON 2 X100HP PUMPS (Hz)	50	45





• **CHILE - South America Field Trials**

AGRICULTURAL COMPANY NADCO CO. SANTA ADRIANA FIELD / CHACABUCO HILL.

We are a dedicated agribusiness company, focused on table grape production since 1994, located in Chacabuco Hill, commune of Colina. The month of September 2011 we have installed the magnetic device, model AGI-400, in to the irrigation system that is currently covering almost 12 hectares, roughly 16% of the total area exploited.

The area irrigated with structured water has been broken down in to two quarters of 7.55 hectares of Thompson Seedless variety and two quarters, 4.21 hectares, of Crimson Seedless variety. The whole area has profoundly suffered of severe drops in water levels delivered from wells, which mainly was the reason we decided to acquire the magnetic implement.

Fortunately, the upshot was a pleasant surprise, results enriched compared to other soil, water and tissue analysis, that was conducted within the same premises, irrigation schemes, and foliage applications throughout the whole irrigation system.

**Some of the laboratory results in Chile:**

1) Water Analysis: - Water hardness decrease by 22% (CaCO3 mg / lt)

2) Soil Analysis:

Lowering of pH to 8.1 (alkaline).

72% increment of available Nitrogen

232% potassium increase (mg / kg)

A decrease in soluble cations / anions:

54% less Sodium and Magnesium (meq / l)

56% less Chloride (meq / l)

56% less Sulphate (meq / l)

28% less Bicarbonate (meq / l)

3) Tissue analysis result. - A total of 11.2% nitrogen increase (mg/100g)

4) Tissue Analysis.

25% less total nitrogen (%)

28% more calcium (%)

In the end, we were pleased with the results, which in practical terms resulted in a 15-20% increase of fruit size for the *Thompson Seedless* variety and a 20-30% for *Crimson Seedless* variety.

A better post-harvest with minor stalk dehydration demonstrated when clusters were left for 6 days at a room temperature. Magnetized branches had a pleasanter appearance as well as taste, especially the Thompson Seedless variety where as regularly irrigated vines presented a higher shelling rate and lower reservice threshold.

**Eduardo Taivo** Agricultural Manager NADCO S.A.

• **Egypt 'Common Bean' research**

New York Science Journal, 2011; 4(6)

The Impact of Magnetic Water Application for Improving Common Bean (*Phaseolus vulgaris L.*)  
Production Helal Ragab Moussa

Radioisotope Department, Atomic Energy Authority, Malaeb El-Gamaa St., P.O. 12311, Dokki, Giza, Egypt. helal\_moussa@hotmail.com

**Conclusion**

It appears that utilization of magnetized water (30 mT) can led to improve quantity and quality of common bean crop. It suggests that magnetic water could stimulate defence system, photosynthetic activity, and translocation efficiency of photo-assimilates in common bean plants. We hope to attract the attention of scientific community to study this important phenomenon. Collaboration with physicists; biologists and physiologists are necessary in order to understand the mechanism of magnetic water action. Generally, using magnetic water treatment could be a promising technique for agricultural improvements but extensive research is required on different crops



- **Egypt Sugar Beet research:**

### Do Magnetic Water Affect Water Use Efficiency, Quality and Yield of Sugar Beet (*Beta vulgaris* L.) Plant under Arid Regions Conditions?

<sup>1</sup>Hozayn M., <sup>2,4</sup>A.A. Abd El Monem, <sup>3</sup>R.E. Abdelraouf and <sup>4</sup>M.M. Abdalla

<sup>1</sup>Department of Field Crop Research,

<sup>2</sup>Department of Botany,

<sup>3</sup>Department of Water Relations and Field Irrigation, Agriculture and Biological Division,  
National Research Centre, El Bchouth St., Dokki, Cairo, Egypt

<sup>4</sup>Department of Biological, Faculty of Science, Tabuk University, Branch Tayma, Saudi Arabia

**Abstract:** Regarding our previous and promising results, magnetic technology as a nontraditional method may be used for improving crop productivity and water use efficiency under field condition. To achieve the aforementioned objective, two field trials using sugar beet (*Beta vulgaris* L.) (var. Baraca) were conducted at Research and Production Station, National Research Centre, Alemam Malek village, Al Nubaria District, Al Behaira Governorate, Egypt in 2009/10 and 2010/11 winter seasons. The experiments contained two treatments i.e., (1) Irrigation with normal water and (2) Irrigation with normal water after magnetization through a two inch Magnetron [U.T.3, Magnetic Technologies LLC PO Box 27559, Dubai, UAE]. The results showed significant positive effects of magnetic treatment of water on quantity and quality of the studied parameters. The percent of increase due to using magnetized water application reached to 21.22% for root weight (kg), 5.72% for root length (cm), 16.22 for root diameter (cm), 19.05% for root yield (ton fed.<sup>-1</sup>), 23.79% for sugar yield (ton fed.<sup>-1</sup>). The increase was 4.04, 2.93, 7.57 and 3.41% for sugar (%), purity (%), recoverable sugar and quality index, respectively. Meanwhile, irrigation sugar beet with magnetized water reduced value of impurity parameters by 13.40, 12.37 and 16.63% for Na, K, Amino-N (mmol 100 g root fresh weight<sup>-1</sup>), respectively compared to irrigation with normal water. Moreover, Water-Use Efficiency (WUE) increased as a result of irrigation by 19.05% compared to control treatment. It appears that utilization of magnetized water can lead to improve yield and quality of sugar beet crop and water use efficiency under newly reclaimed sand soil.

### CONCLUSION

The present study confirmed the promising and previous studies under greenhouse condition. Generally, the present findings have shown that irrigation with magnetized water could be employed as one of the most valuable modern technologies that can assist in saving irrigation water and improving yield and quality of sugar beet under newly reclaimed sandy soil. The usage of magnetic water in the agricultural production will enable intense and more quantities and qualitative production.

Surely wider acceptance of this method is not to be expected, but one thing is crystal clear that the acceded results are indisputable and they are paving the road for their wider implementation in the agricultural production.

- **Egypt Wheat research**

Magnetic water application for improving wheat (*Triticum aestivum* L.) crop production

1Mahmoud Hozayn1\* and Amira Mohamed Saeed Abdul Qados2

1 Agronomy Dept., Agric. and Biol. Div., National Research Centre, El-Bohoth St., 12622 Dokki, Cairo, Egypt.

2Botany Dept., Princess Nora Bint Abdul Rahman University, P. O. Box 2508 Safaqs St . Granada eq. Riyadh 13242 – 07229 KSA

Based on results of our experiment plants irrigated with magnetic water exhibited marked increases in the most of vegetative growth, chemical constitute i.e. photosynthetic pigments (chlorophyll a, chlorophyll b and carotenoids), total phenols and total indole over the control plants. Also, the magnetized water treatment exhibited an increase in the number of protein bands as compared to the control. Moreover, the magnetized water treatment increased yield and yield component at harvest. On average, the increases in grain, straw and biological yield tiller<sup>-1</sup> reached to 31.33, 24.56 and 28.24%, respectively compared with tap water treatment. It appears that the preliminary study on utilization of magnetized water can led to improve quantity of wheat crop.



## Benefits to Livestock

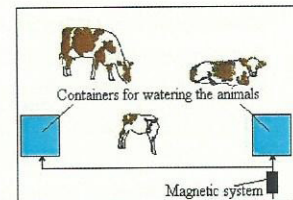
### Benefits of Magnetic Water to field livestock

[Magnetised Water speeds up the metabolism within animals]

- watering: well being, growth and general enhancement in taste and productivity of meat
  - feed: enhancement of feed production in line with general agriculture
  - Manure more efficient treatment and conversion to fertilizer
- ✓ Increase of average weight gain in calves by up to 35%
  - ✓ Increase of average weigh gain in piglets by up to 48%
  - ✓ Increase of average weight gain in lamb by up to 12%
  - ✓ Increase of average weight gain in rabbits up to 10%



Magnetic water, treated and stored by this method, should be used for animal drinking; for the treatment of cows' udder, which will drastically decrease amounts of bacteria in milk. The water should also be used for hygienic cleaning of animal buildings.



### Chicken, Ducks, Geese

- Reduces mortality rate
  - Lessens the Feed Conversion Ratio
  - Stabilizes the food intake
  - Shortens the required nourishment period
  - Increases size and health
- All aimed at a higher performance index

## Poultry Farming



Using magnetic water for drinking purposes of chicks results in an increase in the process of bone formation. As well as, improves morphology of blood. Magnetic water increases growth and development of poultry: decrease by 2-3 times of death rates of chicks and an increase of their mass (average weight gain increases by 5-7%), egg-laying qualities by 10%. Also the quality of meat improves. These results showed that a high-quality, product can be obtained a few days earlier than usual.

## Milk Production

Cow Milk production

%	Description
<b>6%</b>	<b>Increase in milk yield</b>
<b>17%</b>	<b>Increase in butter fat</b>
<b>20%</b>	<b>Increase in milk viscosity</b>
<b>3%</b>	<b>Increase in density</b>
<b>15.8%</b>	<b>Decrease in acidity</b>
<b>2%</b>	<b>Decrease in bacterial count</b>

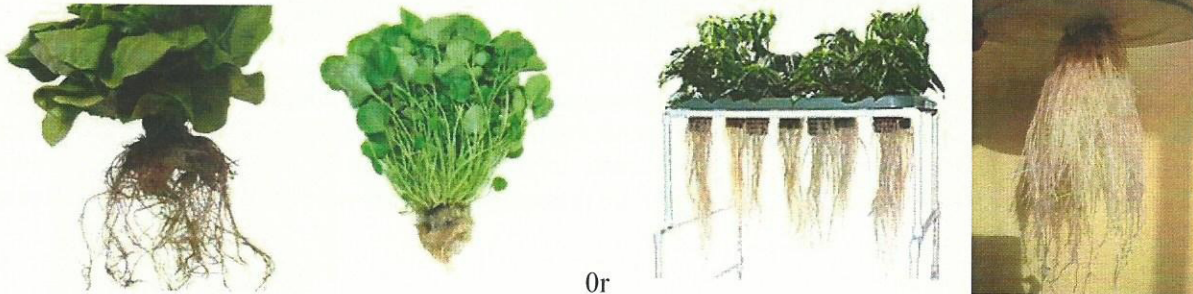
It is known that some cows are difficult to milk which results in slowing down of milking process of a milking machine. Using our method reduces the firmness of the udder and effectively makes it easier to milk. As well as, increases healing effect of the cows suffering from mastitis and increases cows' ability to resist diseases.



## Hydroponics

Iron and Manganese ions oxidize and precipitate out of solution causing problems of staining and nutrient deficiency. This process is exacerbated when the water is sanitized with UV light or chemicals.

- Magnets in the nutrient flow will attract and remove Iron oxide (it is magnetic) keeping the plant root systems and sterilisers cleaner.
- This in turn leads to a cleaner root system, improving nutrient uptake and consequently yield.



## Fish Enhancement

- Magnetising the waters evenly distributes oxygen, breaking molecule clusters. Fish are attracted to and thrive in oxygenated fresh and saline waters, even up to 60,000ppm.
- Suspended pollution drops providing better visibility
- Natural beneficial ecology improves for feeding fish
- Health of fish improves growing faster and larger
- Resilience to disease improves
- Fish stock increases

## Benefits of fish in ecosystem

- Fish are heterotrophic organisms consume autotrophic organisms and use the organic compounds in their bodies as energy sources and as raw materials to create their own biomass. Fish, besides giving a pleasant and lively look to the lakes, helps to keep the aquatic life under control by controlling the population of lower organisms as insects, phytoplankton and zooplankton. Small fish serve as food to higher fish organisms and birds.
- **Magnetised Water creates a proliferation of Fish, creating an evenly oxygenated environment**

## Mosquito Elimination

When infestation of mosquitoes is prolific around water amenities, then by Magnetising water, within lakes, ponds, water courses and TSE open storage for irrigation, this prevents the mosquito larvae survival, by transforming its necessary habitat, by altering stagnated water structure, dropping suspended pollutant food particles, thus eliminating manifestation of the mosquito.

**Magnetic systems** eliminate the alternative option of pesticides, costing thousands of dollars per month to control medium sized public amenity lake environments.

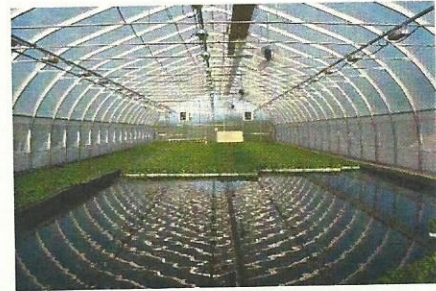
## Organic Fertilizer improvement

### Magnetic intervention:

- Improves the process systems
- Reduces odours
- Enhances benefits to plants and the ground
- Reduces need for non organic fertilizers

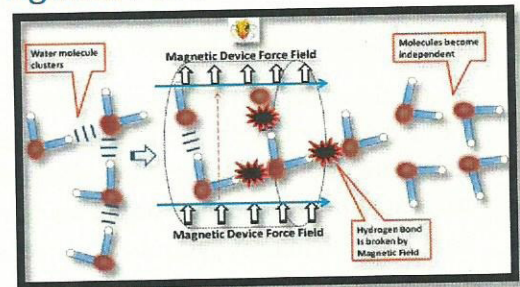
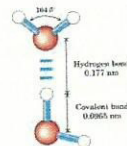
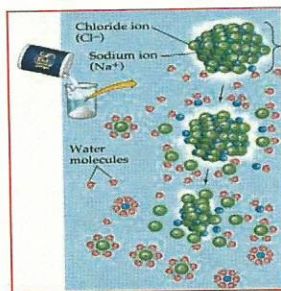


## Aquaponics combined system



**Aquaponics** is essentially a type of hydroponics consisting of two main things. One is fish culture and the other is hydroponics. Instead of adding hydroponics nutrients into the reservoir to feed the plants, they rely on fish to provide the needed nutrients. Here fish waste serves as a nutrient for plants while plants generate oxygen for the fish to survive. With this symbiotic process you can grow healthy fishes as well as plants.

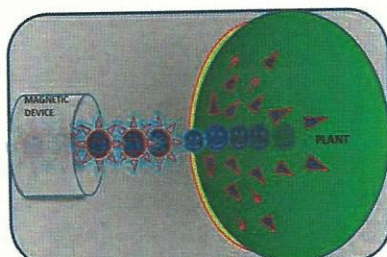
## Magnetising brackish saline water for irrigation use



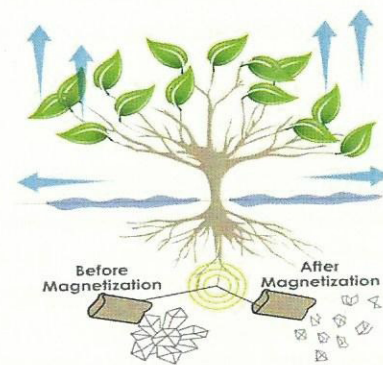
Magnetising brackish water up to 7000ppm alters the molecular structure breaking the hydrogen bonds within the clusters isolating the saline molecules with their additional nutrients making it beneficial to plants

Advantages summary:

- breaking the hydrogen bonds and preventing the damaging salt crystals from forming,
- converting the previously unusable water to a simple absorbable solution,
- carrying greater nutrients than normal fresh water. It has an advantage over fresh water in agriculture irrigation.



Magnetised saline water molecules carry extra nutrients and does not create salt crystals and thus penetrates more easily through the plant cell walls providing extra benefit to the plant



- It has been noted that the creep of saline mix from deltas penetrating up river is increasing yearly, with low laying areas of surrounding agriculture land becoming increasingly desperate for usable irrigation waters.
- Hinterland magnetised brackish waters can be released for irrigation; with the same magnetised water simultaneously flushing the ground from salt encrustations beneficial to agriculture.



## Global Importance Soil Desalination:

This is the potentially the most important breakthrough within the challenges of water sustainability. As previously quoted from international bodies, by the year 2030 it is suggested that the world will be per capita unsustainable within its fresh water consumption. Less than 1% of the world's fresh water (approximately 0.007% of all water on earth) is accessible for direct human uses. Of the 1% approximately 10% goes to industry who use it pollute and dump it. Approximately 10% is used for domestic use of which a quarter directly goes down the WC and wash basin another quarter is wasted in leakage enroute, leaving .5% for human direct consumption which even that will be unsustainable by the year 2030.....But upto a colossal 80% of available fresh water is used by Agriculture for irrigation and livestock of which in many areas upto 40% of that is wasted enroute through leaks and poor distribution.



Solutions to the salinity threat will largely depend on reassigning land and water use for the future and the taking of correcting measures, such as reclamation strategies for both dry land and irrigated or degraded lands affected by saline, saline-alkaline and sodic soils.

### Causes of saline and/or sodic soils

- Saline and/or sodic soil is caused by four separate conditions:
- high salt in the parent material and low rainfall (low leaching);
- high rainfall with poor internal drainage;
- a high water table that carries salt to the soil surface, and
- a high amount of salt being applied through chemicals, manure and poor quality irrigation water.

Before a reclamation system can be established, the factors causing salt accumulation must be eliminated or minimised.

Ions most commonly associated with soil salinity include the anions: chloride (Cl<sup>-</sup>), sulphate (SO<sub>4</sub><sup>=</sup>), carbonate (HCO<sub>3</sub><sup>-</sup>), and sometimes nitrate (NO<sub>3</sub><sup>-</sup>) and the cations: sodium (Na<sup>+</sup>), calcium (Ca<sup>++</sup>), magnesium (Mg<sup>++</sup>), and sometimes potassium (K<sup>+</sup>). Salts of these ions occur in highly variable concentrations and proportions.

### Effect of salinity on crop production

Plant growth and yield are limited mainly by the soil environment factors. Soil, water, nutrients, salinity, sodicity, structure, temperature, pH, and mineral toxicities can all interact to limit plant growth.

In Saline soils although pH (<8.5) and ESP (<15%) are not high, CEC is >4 mmhos/cm and an excess of soluble salt in the subsoil restricts water uptake by crops; in the case of alkalinity there are Nutrient deficiencies (either because of a lack of nutrients, or because roots are unable to access them). The best way of understanding these limitations is to consider them in terms of the interacting factors that directly influence crop growth.

## Traditional methods of reclamation of saline and sodic soils

Drainage carries the salts down through the soil profile and out of the rooting zone. Without drainage, salts will accumulate regardless of any applied soil amendments. But the limitation associated with drainage is that it is an expensive operation requiring complex technical knowledge.



- **Leaching and reclaiming saline soils**

Saline soils cannot be reclaimed by any chemicals, conditioner, or fertilizer. Reclamation of these soils consists of simply applying enough high-quality water to leach the soil thoroughly. The water applied should be low in sodium but can be fairly saline (1,500 to 2,000 ppm total salt), as this helps to keep the soil permeable during the leaching process. Generally, about 12 inches of water are required to remove 70 to 80 percent of the salt for each foot of soil.

Limitation: Application of excess water can create extra management problems due to the threat of high water tables, increased expense of irrigation water and difficulty in maintaining adequate levels of soil nitrate for crop growth.

- **Reclaiming saline and sodic soils**

In sodic soils, the exchangeable sodium is sometimes so great that the resulting dispersed soil is almost impervious to water. Sodic soil can be treated by replacing the absorbed sodium with a soluble source of cation i.e. calcium. Calcium may be made available through manipulation with native gypsum already in the soil, calcium in irrigation water (Calcium chloride), or commercial amendments. They may be useful where soil permeability is low due to low salinity, excess sodium, or high carbonate/bicarbonate in the water.

In order to reclaim soil to a depth of one foot, gypsum recommendations are as follows: tons of gypsum per acre =  $1.7 \times (\text{meq Na}/100 \text{ g} - (\text{CEC} \times 5\%))$ .

Reclamation of a foot depth of sodic soil on one acre requires approximately 1.7 tons of pure gypsum for each milliequivalent of exchangeable sodium present per 100 grams of soil. For example, if soil has a CEC of 20 milliequivalents per 100 grams and 30 percent exchangeable sodium, there would be 6 milliequivalents of sodium per 100 grams of soil. Thus, 10.2 tons of gypsum ( $6 \times 1.7$ ) per acre would be required to reclaim this soil.

If sodic soils contain no source of calcium (gypsum or free carbonates), then gypsum or a soluble calcium source needs to be applied. However, the reclamation process is not complete until most of the sodium is removed from the soil to at least a depth of three to five feet. Even then, more time is required for restoration of good soil productivity.

Limitation: Once the soil structure is completely destroyed, it is slow to return to a desirable condition. Correcting saline and sodic soils requires salt to be leached out of the soil profile. This requires good quality water, good soil permeability and good drainage. Amendments that supply soluble calcium are needed in huge quantity to correct sodic soils.

### Crucial growing problem of saline contamination:

It stands to reason that soil desalination is a crucial growing problem nowadays. It is noteworthy that the possibility of using magnetized water to desalinate the soil accounts for its enhanced dissolving capacity which has been registered repeatedly.

- **Soviet experiments:**

Soviet scientists staged a myriad of trials on the soil for experimental drainage. They came to establish that the density of magnetised water which had penetrated the solid layer was 0.1 g/cm more than that of unmagnetized water. It was noted that filtration rate had been doubled. In the case of magnetised water, every 100g of soil had salts removed by 10g more. as soon as 5% water solution of technical green vitriol was exposed to magnetic treatment, it yielded an improvement which leached of the soil 20g more of salts per every 100g, as opposed to regular water.



• **MagTech Targeted solution:**

So that is the targeted 'problem' that within the Magtech team it is viewed as the potentially easiest to convert for direct human usage, both in land and water resource; even if only converting 5% water from agriculture to domestic, this potentially makes available ten times the existing availability for direct human consumption. How? by applying magnetic technology to brackish saline mixed water, releasing 'unusable problem water of today' back into direct use for crops and vegetation. Plus at the same time eliminating saline soil contamination potentially releasing millions of acres of marginalised land back into productivity.

**Magnetising Seeds improving germination**

**Seeds**

**Changes in germination behaviour of wheat seeds exposed to magnetic field and magnetically structured water**

Babar Ijaz<sup>1</sup>, Shakeel Ahmad Jatoi<sup>2</sup>, Dawood Ahmad<sup>3</sup>, M. Shahid Masood<sup>2</sup> and Sadar Uddin Siddiqui<sup>2</sup>  
<sup>1</sup>University of Agriculture, Faisalabad, Pakistan.  
<sup>2</sup>Plant Genetic Resources Programme, NARC, Islamabad-45500, Pakistan.  
<sup>3</sup>Institute of Biotechnology and Genetic Engineering (IBGE), Peshawar, Pakistan.

- **Seed treatment** The magnetic device was funnel shaped (Figure 1a) and seeds were passed through it slowly with uniform speed. The numbers of seed passing were 0, two, four and six times. Table 1 summarizes the treatments and their representative codes. The seeds were sown immediately after passing through magnetic device.
- **Water treatment** The magnetic device for water treatment was also funnel shaped with small size (Figure 1b). The numbers of water passing were 0, three and six times. This magnetized water was used to moist the paper towel before sowing seed.



1b

Wheat seeds with low vigour were subjected to either magnetized water and seed magnetization or both. A definite influence of magnetization was noted on the structure of water and physiological properties of seeds when exposed. The structural water affects wheat seed germination positively and proportionally to the number of passing through the device. This study therefore recommends the use of water magnetization for the enhancement of wheat seeds germination.



1a

**Sample Range of Magnetic Devices:**



Magnetic Technologies can provided devices for all applications from small to very large capacity, from PVC to Stainless Steel and if necessary design a bespoke device to suit





## Choosing a magnetic system for irrigation and water treatment

- The choice of a magnetic system depends on the quantity of water used daily irrigating your land area.
- These calculations are based on the maximum amount of water needed for irrigation in hot countries, including UAE, where the average amount of water needed for 1m<sup>2</sup> is 12 liters/day.
- Using the table below, you will easily be able to choose the right magnetic system needed to irrigate a particular area.

Size of your land	Magnetic devices necessary for irrigation	Output of a device
From 0,25 to 0.5 hectare	A100 A100s	2-3 m <sup>3</sup> /hr 3-5 m <sup>3</sup> /hr
From 0.5 to 0.75 hectares	A150D	6-10 m <sup>3</sup> /hr
From 0.75 to 1.5 hectares	ADS200 AGI200	8-12 m <sup>3</sup> /hr 14-20 m <sup>3</sup> /hr
From 1.5 to 3 hectares	A300 DU AGI300 D	20-40 m <sup>3</sup> /hr 20-40 m <sup>3</sup> /hr
From 3 to 5 hectares	A400 AGI 400 D	35-55 m <sup>3</sup> /hr 35-55 m <sup>3</sup> /hr
From 5 to 10 hectares	A600 AD600	70-120 m <sup>3</sup> /hr 80-160 m <sup>3</sup> /hr
From 10 to 15 hectares	AGI 800	130-220 m <sup>3</sup> /hr

### Results: visible one week after the installation

- A significant increase in the efficiency of industrial processes:
- accelerates flocculation, coagulation, sedimentation and filtration processes
- increases efficiency of extraction
- reduces corrosion processes
- reduces growth rates of mineral and biological sediment
- individuals and companies benefit from lower operating costs and lower energy consumption

### Natural Waters Expectations

Lakes, Rivers, Sea Lagoons, Ponds Including Fresh Water, Ground Water & TSE Expectations

After treatment the following changes occur:

- renewal of natural biological processes
- improvement of water biosphere
- elimination of bad odours
- increase in fish production as a result of lower death and disease rates
- improves ecology around the area



## In Summary

- Russian Scientific development from 60s to 90's, with 50 institutes and 500 scientists in the 80's headed by Prof Yuri Tkatchenko who since relocated and created Magnetic Technologies LLC UAE in UAE in 1995 with Sheikh Junaid Khoory
- Proven highly effective and cost efficient within numerous sectors
- Based on using permanent magnetic fields in order to influence charged water particles by a Lorentz force.
- A change occurs in the structure of the water without altering its physical state, acquiring significant enhancement in its properties in addition to it becoming structured.
- No Chemicals are required.....No additional power source needed
- easily installed devices, constructed from a range of materials dependent upon environment and use
- Producing improved yield from Fruit trees to field crops to internal tunnel produce
- With additional benefits to infrastructure maintenance, including drip feed and spray nozzles efficiencies
- Spray efficiency is improved by capacity in reducing micro spray droplets and with additional accuracy and improved magnetic water absorption by the targeted plants, improving yield and resilience



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