



Saves Water

**Smart
Automated
Technology**



-Aardra Systems-

The system senses the moisture in the soil and replenishes adequate moisture automatically for the plants. Precise amount of water is delivered according to soil composition and the plants need. Designed for gardens, landscaping projects and farms. It can be integrated into existing irrigation systems. Not only does the system introduce automation but saves water up to 70% and contributes towards reducing water costs and promoting improved yields.

-PROCOM-

The Procom is the main control unit where all the peripheral devices are managed.

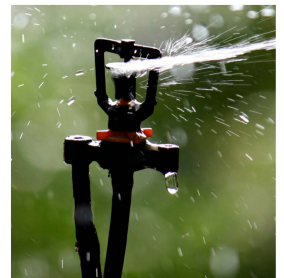
- It manages devices such as Sencom, Valcom and X-Com in its dedicated private wireless network.
- It displays all relevant information for each device.
- It creates and manages up to 50 irrigation zones, firstly by pairing a Sencom and Valcom, and then by setting each zone with its moisture requirement.
- Powered with a Li-Poly battery and power charger.
- Communicates over a secure wireless protocol with a 500 meters line of sight range.



-VALCOM-



- Controls the Valtor's water dispensing operation for an irrigation zone when requested.
- Communicates wirelessly with the Procom and associated Sencom, relaying all operational instructions.
- Solar powered with a Li-Poly backup battery for outdoor usage and a standard power adaptor for indoor usage.
- Provides power to a Valtor when connected via the connection port, making the Valtor also solar powered for outdoor usage.
- Communicates over a secure wireless protocol with a 500 meters line of sight range.



-SENCOM-



- Interfaces with the Sentor periodically and relays the relevant sensor data to both the Procom and the Valcom for each zone for optimal control operations.
- Solar powered with a Li-Poly backup battery for outdoor usage and a standard power adaptor for indoor usage.
- Provides power to a Sentor when connected via the data connection port, making the Sentor also solar powered for outdoor usage.
- Communicates over a secure wireless protocol with a 500 meters line of sight range.



-SENTOR-



- The sensor analyses the moisture level of the surrounding soil.
- Volumetric readings from the soil range from 0% to 50%.
0% representing extreme dry conditions and 50% representing flood like conditions.
- The Sentor periodically monitors the surrounding soil and relays the data readings to both the Procom and the Valcom so that the associated irrigation zone performs an optimal control operations.
- Connects to the Sencom via the data connection port.
- Variable cable lengths available.

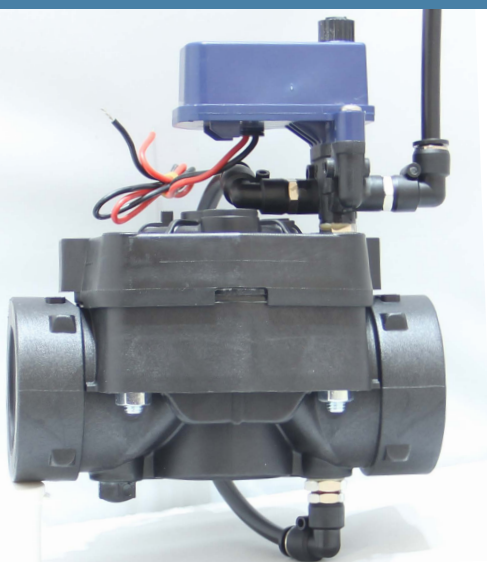


-VALTOR-



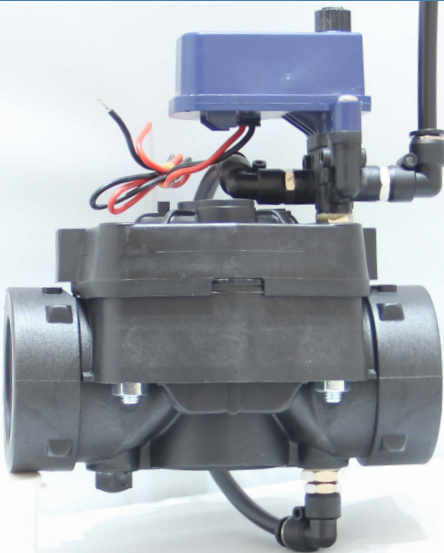
- The valve is powered and controlled by the Valcom, whenever the moisture level recedes, the Valtor will be controlled to provide adequate water.
- The VALTOR is connected to the water source using standard irrigation fittings.
- Type: Pilot operated, Straight Connections
- Connection Size:
Inlet: 3/4" BSP Outlet: 3/4" BSP
- Pressure Rate: 0.7 to 6 bar
- Flow Rate: 30 Litres/min

-VALTOR 1.5-



- The valve is powered and controlled by the Valcom, whenever the moisture level recedes, the Valtor 1.5 will be instructed to provide adequate water.
- The VALTOR 1.5 is connected to the main water supply using irrigation fittings.
- Connection Size:
Inlet: 1.5" Outlet: 1.5" BSP/NPT - Threaded Version
- Pressure Rate: 0.4 to 10 bar
- Flow Rate: 1000 Litres/min

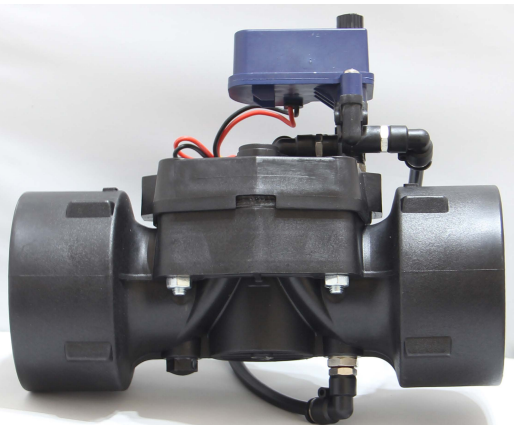
-VALTOR 2-



- The valve is powered and controlled by the Valcom, whenever the moisture level recedes, the Valtor 2 will be controlled to provide adequate water.
- The VALTOR 2 is connected to the main water supply using irrigation fittings.
- Connection Size:

Inlet: 2"	Outlet: 2"	BSP/NPT - Threaded Version
Inlet: 2"	Outlet: 2"	ISO/ASTM - Solvent Version
- Pressure Rate: 0.4 to 10 bar
- Flow Rate: 1000 Litres/min

-VALTOR 3-



- The valve is powered and controlled by the Valcom, whenever the moisture level recedes, the Valtor 3 will be controlled to provide adequate water.
- The VALTOR 3 is connected to the main water supply using irrigation fittings.
- Connection Size:

Inlet: 3"	Outlet: 3"	BSP/NPT - Threaded Version
Inlet: 3"	Outlet: 3"	ISO/ASTM - Solvent Version
- Pressure Rate: 0.4 to 10 bar
- Flow Rate: 1300 Litres/min

-VALTOR 4-



- The valve is powered and controlled by the Valcom, whenever the moisture level recedes, the Valtor 4 will be controlled to provide adequate water.
- The VALTOR 4 is connected to the main water supply using irrigation fittings.
- Connection Size:

Inlet: 4"	Outlet: 4"	BSP/NPT - Threaded Version
Inlet: 4"	Outlet: 4"	ISO/ASTM - Solvent Version
- Pressure Rate: 0.4 to 10 bar
- Flow Rate: 4100 Litres/min

-IoT Air Quality Sensor-



Outdoor Version

Nitrogen Dioxide:

Range: 0 to 2000 ppb.

Noise: ± 15 ppb

Over gas limit: 50 ppm

Operating temperature range: -30 to +50 °C

Response time: < 80 Seconds.

Power up stability: 6 hours.

Calibration duration: 24 months.

Temperature & Humidity

Humidity Range: 0 to 100% RH

Temperature Range: -40 to 125 °C

Monitor air quality remotely by either:

- (1) Integrating the sensor to an existing Aardra IoT controller.
- (2) Using an optional Integrated GPRS/NB-IoT/Cat-M1 module for independent air monitoring applications.

Particulate Matter:

Mass concentration: PM1.0, PM2.5, PM4 and PM10.

Range: 0 to 1,000 $\mu\text{g}/\text{m}^3$

Accuracy (0 to 100 $\mu\text{g}/\text{m}^3$): $\pm 10 \mu\text{g}/\text{m}^3$
(100 to 1'000 $\mu\text{g}/\text{m}^3$): $\pm 10 \%$

Number concentration: PM0.5, PM1.0, PM2.5, PM4 and PM10.

Range: 0 to 3,000 1/cm³

Operating temperature range: -10 to +60 °C

Sensor Element Lifetime: 24h/day operation >8 years.



Indoor Version

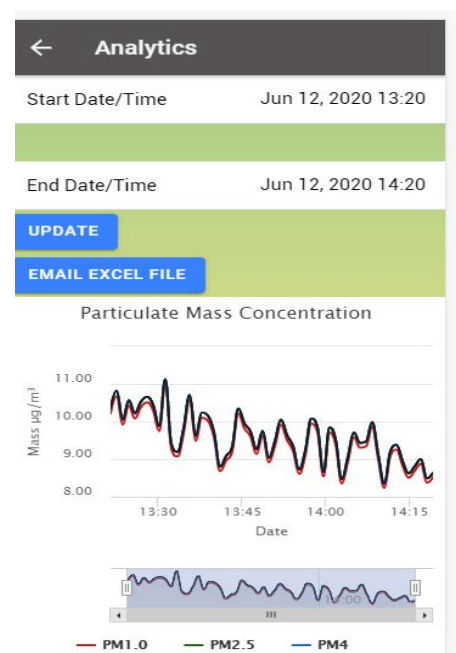
Power Requirement:

Input: 5V DC 0.5A.

-Power Source Options-

(1) Solar Panel- For outdoor use

(2) AC/DC power adaptor - For indoor use

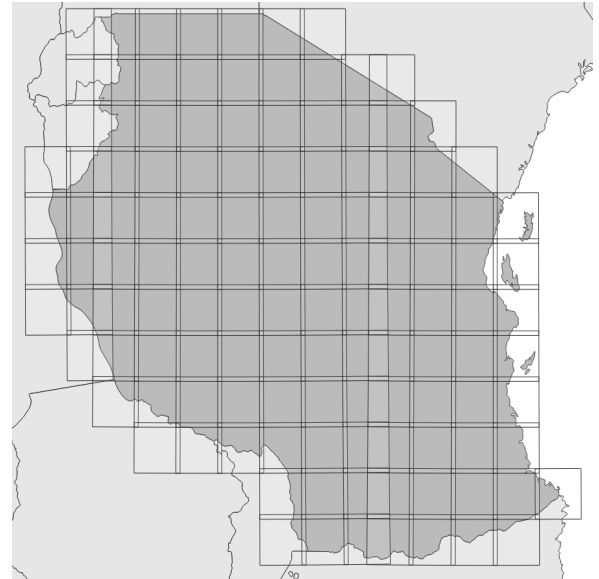


-Satellite Crop Health Analysis-

The 'Earth-facing' discipline of remote sensing utilises both airborne and satellite systems that enable the mapping and monitoring of the surface of the Earth. This provides a wealth of knowledge (both topographic and thematic information), unobtainable at such broad scale, through other means. Satellite-based EO has rapidly increased in popularity since 1972 with the launch of the first Landsat satellite. Since, there have been progressive improvements in the spatial, temporal and spectral capabilities within EO sensors, combined with the necessary expertise and processing techniques. This offers the possibility to provide more insight into agriculture.

EO is relevant to agriculture because:

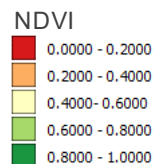
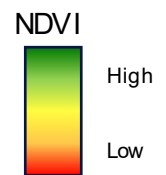
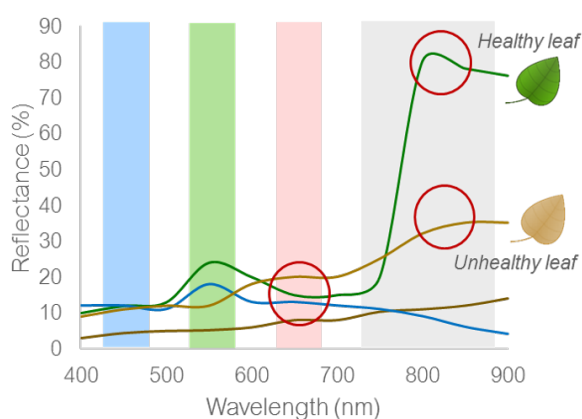
- Country-wide areas covered by imagery (generally remote and can be difficult to access) – EO offers comprehensive large-scale and detailed coverage over wide areas.
- EO sensors provide the opportunity for consistent, objective mapping over time so that change can be monitored and evaluated.
- EO enables an evaluation of characteristics of the landscape and vegetation that cannot be easily or quickly assessed even when access is possible.
- EO data are not a universal panacea. Not everything can be mapped, all of the time. However, the array of imagery that is available provides field scale to the wider area perspective, as well as tracking cause, effect and change not directly possible with field work (particularly considering large areas or areas difficult to access on foot).



Sentinel-2 Satellite tile coverage
-125 Sentinel-2 tiles cover Tanzania
-Each tile is captured every 5 days (cloud

Normalised Difference Vegetation Index (NDVI) is a very common vegetation index, used widely as a measure of vegetation productivity. Green, healthy vegetation will have a high NDVI whereas bare ground and water will have a low NDVI. Having access to current and archive imagery, it is possible to evaluate current crop condition, compare this to history and predict what may happen based on forecasted conditions.

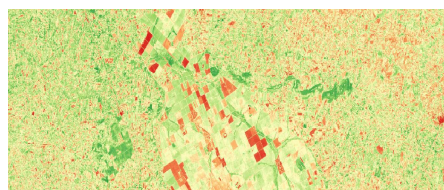
Normalised Difference Vegetation Index



December



January



March



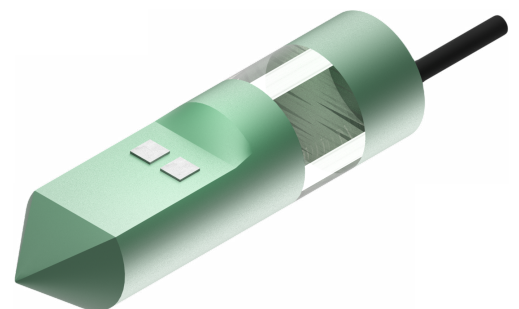
-IoT Controller-



- Access Aardra Cloud using a mobile device or the web portal.
- Various subscription plans to the Aardra cloud platform.
- Control multiple IoT controllers from one cloud account.
- Create multiple automatic operational zones.
- Monitor various sensors remotely.
- Regular status alerts from IoT devices and zones, including any irregular activities.
- Input/Output ports per device:
 - 8 x Latching output ports for Valves and Relays. (Expandable with an additional expansion interface)
 - 3 x Input ports for sensor such as Flow and Float.
 - 1 x Data port for additional sensors such as: moisture, environmental, fertility and many more. Custom requirements will be interfaced to IoT device using this port.
- Integrate third-party analytical tools and data such as satellite imagery to improve productivity, yield quality and value.
- Mobile Network Connectivity: NB-IoT, Cat-M1 and GPRS.
- Optional RF communication module for legacy devices and RF controlled interfaces. 15 Km line of sight range.
- Power requirement, 5V DC 0.5A. Source, AC/DC power

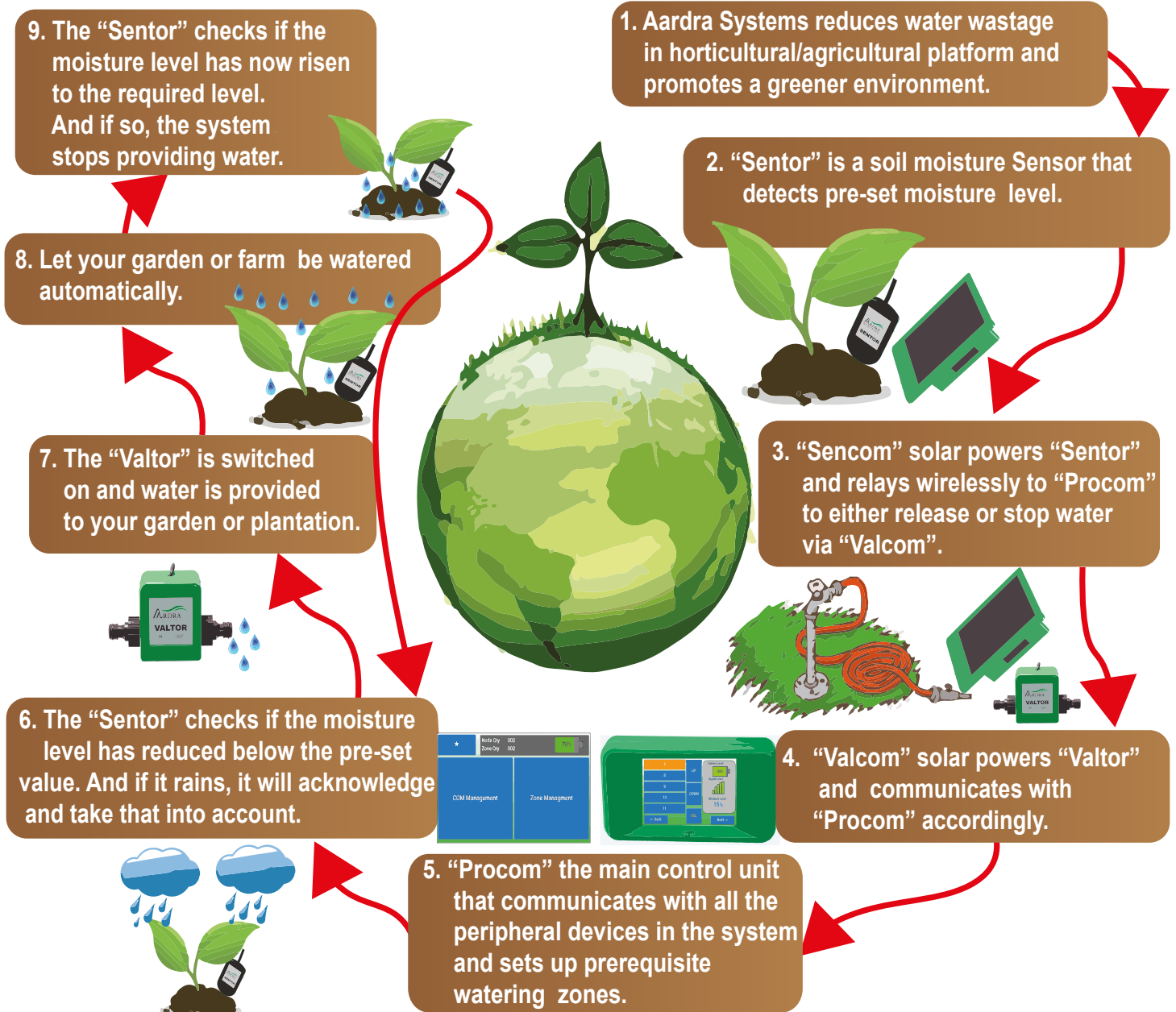


-IoT Controller-



-Sensor II-

-How it works-

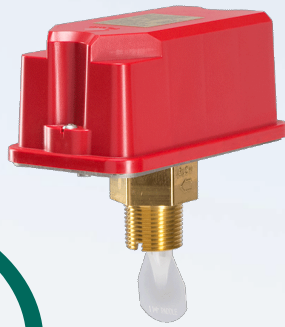


-Plantation Binder -

Claim your complimentary plant binder gift with the purchase of a full Aardra System.



Integration into your current Irrigation Setup



Yes

Does the water supply to the irrigation piping system require an additional water pump?

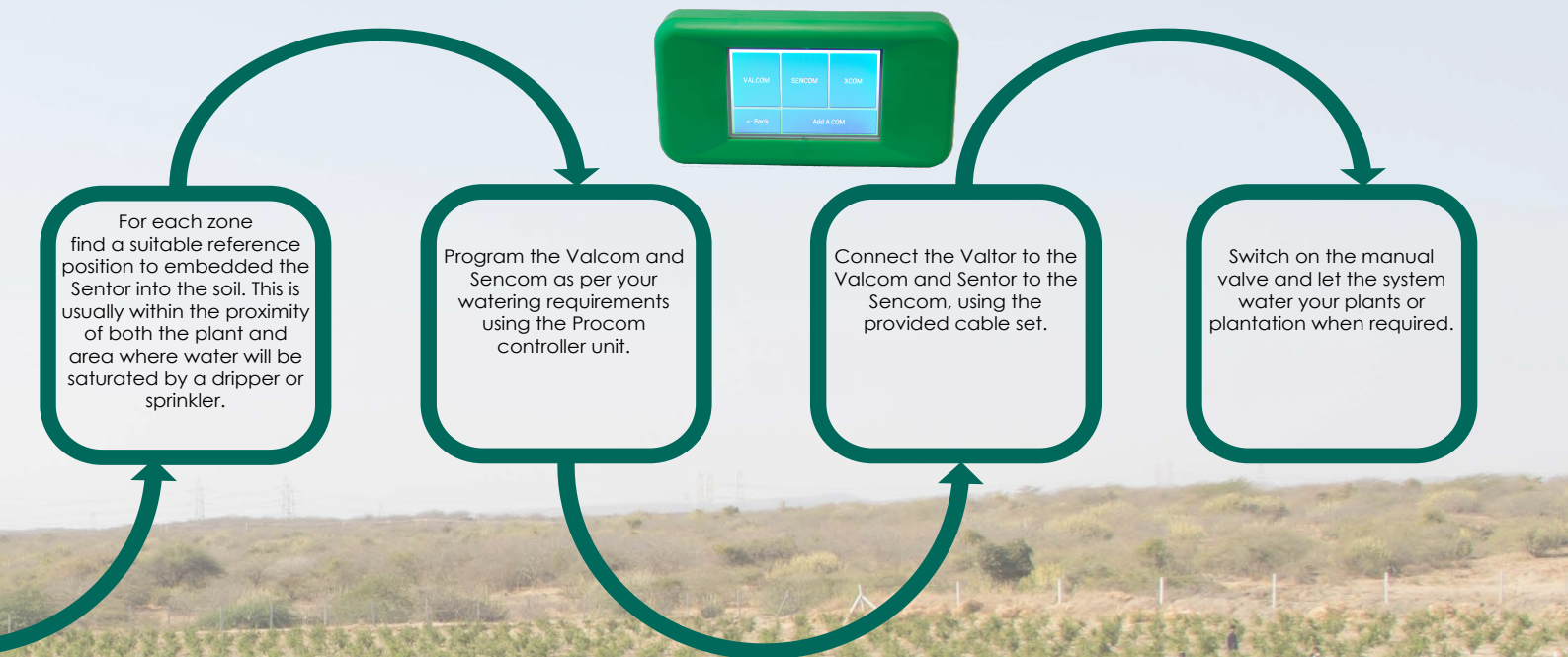
No

Contact your pump manufacture or your irrigation plumber, requesting either a pressure or flow switch to be fitted to the output of the pump.

Determine the quantity of irrigation zones. This is usually determined by the quantity of manual valves between the primary pipe and each secondary pipe that connects to a section of drippers or sprinklers.

For each zone, a Valtor must be fitted between the manual valve and the secondary pipe. The size of Valtor is determined by the size of the secondary pipe and the volume of dispensed water. Switch off the manual valve.





Testimonial 1

Name: Mr V. Patil - Wheat Experiment (Farmer/ Owner)

Area: Gandhinagar **State:** Gujarat **Country:** India

Current situation:

The Experiment was to be conducted in an Area of 15 Acres where the soil condition is very dry in the summer seasons and quite adequate in the winter seasons. The irrigation pipes from the source were 2" to peripheral area. 1" pipe was laid in rows and from it, 16mm were dispensing water to all the wheat area (sprinklers).

The owner's dilemma is, his annual consumption of water and electricity to pump the water out in the field does not leave much margin in his finance to re-invest.



Innovation:

Aardra Systems installed the system and within few months the outcome was significant, both in water economy and growth of yield from quality and quantity. The land moisture was maintained as per programmed in different rows.

"Aardra System has achieved our vote and our expectations in full. The functions are practical and rewarding. As you can see from our farm, provides a new viewpoint from which to appreciate economy in water and yet yields are enhanced." owners

Testimonial 2

Project: Tracey P (Beautician/therapist/ consultant)

Area: Essex **City:** London **Country:** United Kingdom

Current situation:

Tracey is a frequent traveller as demanded in her profession and in a year, she spends a percentage of her income on Gardening. Although she has a local gardener to look after her garden while she is away, her garden still suffers wilting of many expensive plants, simply because the gardener is busy elsewhere in their schedule. She initially introduced watering by manual irrigation method and the success rate was not much because she had to keep up to the time for watering and her career demanded to be elsewhere. She then introduced timer-based watering method and that had some success but in situation like rainy days it would flood the area while on a harsh sunny day it will let the plants wilt before it waters, so as a result many plants died and had to be replaced. So, her struggle to find an appropriate system was always on a look out in the market.



Innovation:

Aardra System was introduced to her by her garden centre and her garden problem receded together with her annual cost of replacing dead or over flooded plants. The system works on a basic principal that involves replicating the whole area with uniform moisture level and it checks every 5 secs to evaluate the pre-programmed level as a result the plants were always having adequate moisture for it to flourish and progress to its prime. To date her conviction towards the system is, that she is very content with it as it functions as a personal gardener that waters the plants when required. Watering cost and plants replacement cost has considerably come down and yet the plants are in their prime. Tracey said:

"Based on the excellent service from enquiry to completion, I will definitely refer Aardra Systems to all my friends, clients and family in the future."

Testimonial 3

Name: R Patel (Farmer/ Owner) 2016/17

Area: Bhuj **State:** Gujarat **Country:** India

Current situation:

The Farm area is of 70 Acres and soil condition is very dry in the summer seasons and quite adequate in the winter seasons. The crop is pomegranate (8000 bushes) and is watered through water tank that holds 50,000 litres.

Mr Patel's dilemma is, his annual consumption of water and yields quantity and quality does not leave much margin in his finance to re-invest. He has manually driven irrigation system to all his 8000 bushes of Pomegranate, but it does not equate in favour of good quality yields.



Innovation:

Aardra Systems installed the system for a Year and the outcome was significant both in water economy and yields quality and quantity. The economics of saving water was clearly up to 65% and hence the cost associated with acquiring water per litre was lowered as well. The quality of the plant was very striking and thus it produced fruits that were on an average of 350gm, 100gm more than previous fruits. In the market the fruits were dealt on the size and weight and both proved to be a good investment. Mr Patel's verdict was that the system is a clear winner to him and his farms predicament.

"So far Aardra System has met our expectations in full. The functions are practical and rewarding. As you can see from our farm, provides a new viewpoint from which to appreciate economy in water and yet yields betterment."



Testimonial 4

Project: M Joisi (Performing Artist/ Owner)

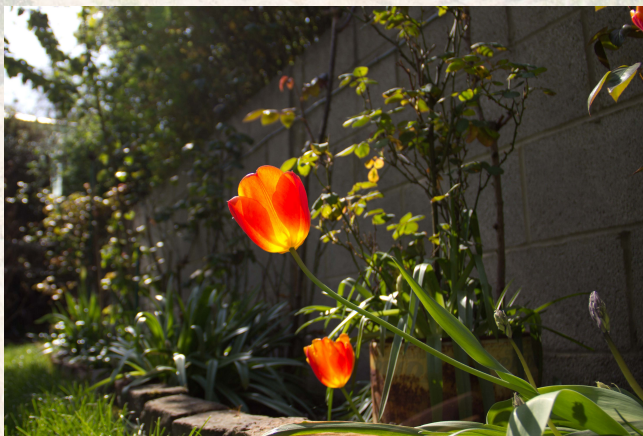
Area: East London **City:** London **Country:** United Kingdom

Current situation:

The garden has many features:

- Rows of Roses
- Grass land
- Vegetable plot
- Fruits trees and vine

In mixture of all this vegetation there is a tree house feature with collection of orchids. The difficulty in the garden is that all the plants require different moisture in the soil to flourish. The gardener cost has been jacking up quite considerable and with the irrigation system installed, it is not sufficing its use.



Innovation:

Approached Aardra Systems from advertisement in the landscape magazine, held meeting with her and her gardener, the system was installed and observed for six months from the season of spring to summer. The challenge was to disperse water with different moisture level in different part of the area. Aardra System is built to these challenges and predicament. At the end of the summer season, the plants slowed down in their growth but carried on dwelling with less demand on the system for moisture level to be dispersed in the soil and the garden woke up to new spring time the year after. Miss Joisi's verdict was that:

"With little investment, I achieved big reward and as with the performance, it is out right remarkable, within 6months I recovered the cost of the system."



Living Wall Gardens



Benefits

-Air Purification & Dust Suppression-

Our living green walls increase the oxygen in the air and decrease CO₂, whilst reducing particulate matter in the atmosphere and suppressing dust, thereby combating respiratory illnesses. Countless research has proven that plant leaves alone are capable of cleaning formaldehyde and carbon monoxide from the air, with plant roots cleaning up the rest of the 'toxic chemical soup'. Improving the air and water quality in this way is desperately needed in our city, especially in the street canyons.

-Rainwater Harvesting & Solar Energy-

Our living walls use less water per plant than conventional container planting. With the added benefits from the use of solar panels and rain water for our irrigation system, this creates a cost effective solution (also reducing power consumption). With rain water harvested from the roof, the plant roots and substrate filter any grey water to remove pollutants.

-Sound Reduction & Protection of the Building-

The blanket of insulation created by the vegetation and substrate in our green walls reflects, refracts and absorbs acoustic energy, which cuts noise pollution and protect against sound vibrations from the underground. The protection it provides from the elements and ever changing weather in our city, also prolongs the longevity of the building structure itself, which is very beneficial. Studies have shown a dramatic difference in temperature from the front of the living wall to the space behind the living wall, reducing a need for air conditioning in warm weather, as well as reducing heat loss from the building in winter.

-Increased Wellbeing of our City & Biodiversity-

Finally, our living walls are proven to provide an uplifting and calming effect whilst boosting the productivity for workers in our city. With the huge varieties of colour, texture, patterns and sizes of our plants, our living walls become living art and provide a habitat for insects, small birds and mammals. This increase in biodiversity will bring joy to anyone nearby.



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