AgriTechs

AgriTechs | The technology to feed the world!

Precision Agriculture Technology Procedures to improve Strawberry cultivation.

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It's about Strawberry

Growing requirements and habits of the plant Strawberry

Strawberries are low-growing woody plants with fibrous root systems. Some of the major factors that precisely affect vegetative growth, quality, and yield are temperature, photoperiod, and light intensity. Ground gardens, raised beds, and containers are exceptional growing areas for strawberries. It requires low fertilizers compared to other horticultural crops.

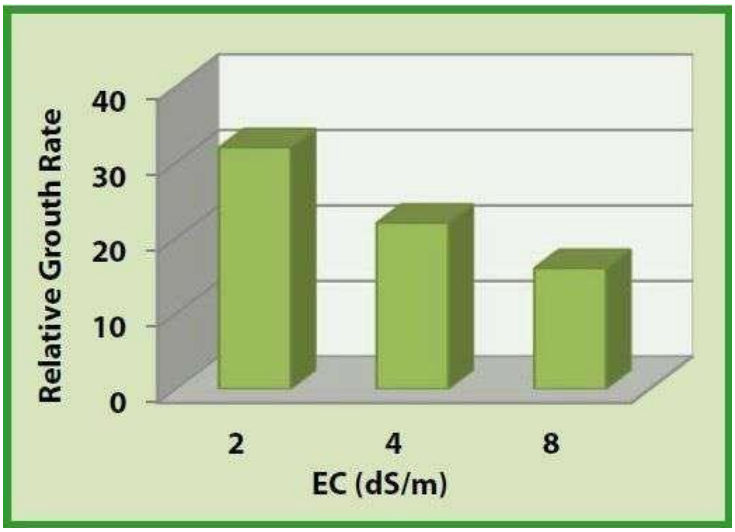
Agronomical Benchmarks for Strawberry

Temperature

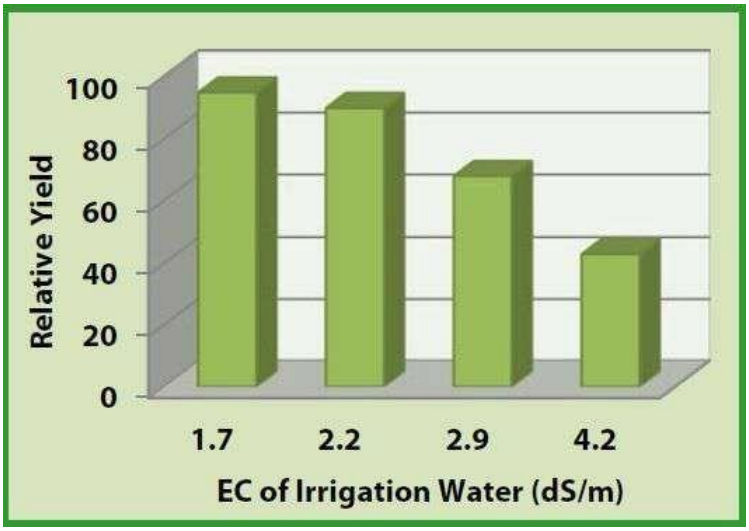
Greenhouse Strawberries grow rapidly under optimum environmental conditions, and fruit production begins 4 to 5 months after seeding. For good production, a temperature range of **18 – 25 ℃ (65-77°F)** during the day is desirable. While peak daytime temperatures of 29 - 25℃ are tolerable, prolonged periods of high temperatures may negative effect on the size and fruit quality. Night temperatures no lower than 10℃ will allow a rapid growth rate. Below 10℃ may lead to deformed organs in fruits besides higher nighttime temperature results in lower quality due to respiration effects on the fruit.

Relative humidity,

High relative humidity (RH) generally favors the growth of Strawberry plants. The crop can adjust relative humidity within the range of 60 - 80 % lower humidity can have inimical effects on the calcium uptake which will eventually result in tip burn and calyx burns which would have overall negative effects on the photosynthesis and quality of the fruits while a higher relative humidity flavors the nutrient movement.



The effect of E.C. on the relative growth rate of strawberry (cv. *Dina*) seedlings (*Al-Harbi,* 1995*)*



The effect of salinity on strawberry yield (Ayers, 1977)

Growth Requirements

There is a wide range of strawberry cultivars including those that are well adapted to winter cold and spring frost or summer heat and drought. Cultivars also vary widely in their need for chilling and time of bloom and ripening period. Most production is focused in temperate and Mediterranean climates, between latitudes 28 and 60˚, with average **midsummer temperatures of 15-30˚C**. Strawberries require a steady supply of water. This is most critical at the establishment and during fruit development (from petal fall to end of fruiting), otherwise, there will be a reduction of leaf area, photosynthetic rate, and yield. Creating water stress – in specific 60-day plants - at the later stage of flowering, through reducing crop irrigation, can be used, however, to increase flower numbers and fruiting.

In contrast, **too much water leads to malformed fruit. Very high temperatures can have a negative effect on growth and are detrimental to photosynthesis and productivity.** Temperatures above 25˚C can reduce fruit set, levels of Total Soluble Solids (TSS) and at the same time, hasten fruit development. High temperature can also reduce fruit size, and lead to tissue damage, softness, and breakdown near the berry surface.

Pollination is largely carried out by insects such as bees and bumble bees – which are increasingly introduced to crops grown in tunnels to aid this process. Poor pollination – particularly in cold conditions or due to lack of boron, or damage due to high or low temperatures, insects, or disease - can result in malformed fruit. This poor, distorted berry formation is due to the restricted formation of auxins. However, while auxins can be applied to the crop to counteract these effects, this can hurt the fruit ripening process.

Malformed fruit

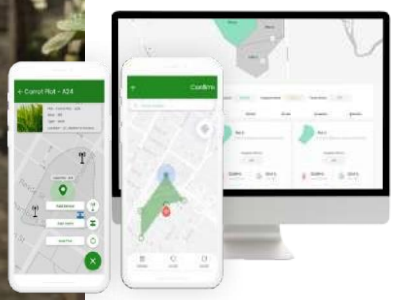
Ref: Yara International ASA- Strawberry Plantmaster

Weather

Light intensity

Micro climate

Soil moisture & fertility



Monitor

An array of sensor network

Analyse

Power of AI and data science powered **IoT Platform**

Action

Predictive crop-specific timely insights and alerts

DigiPlant is a digital twin of a random real plant. Which experienced the same treatments and microclimate that experienced by a real plant in the field. DigiPlant will get power from the sun just like a plant. And just like the plant it also experiences the same microclimate parameters like **Soilmoisture, Fertility, Ambient temperature, Sunlight, and Humidity**. But the DigiPlant transmits the experienced parameters to AgriTechs cloud platform in real-time.

- Improve labor efficiency
- Reduce energy consumption
- Improve crop quality and yield
- Correlation research on growth vs. Environment (Co2, Light, Temperature, RH)
- Correlation research on growth vs soil parameters (Salinity,moisture)

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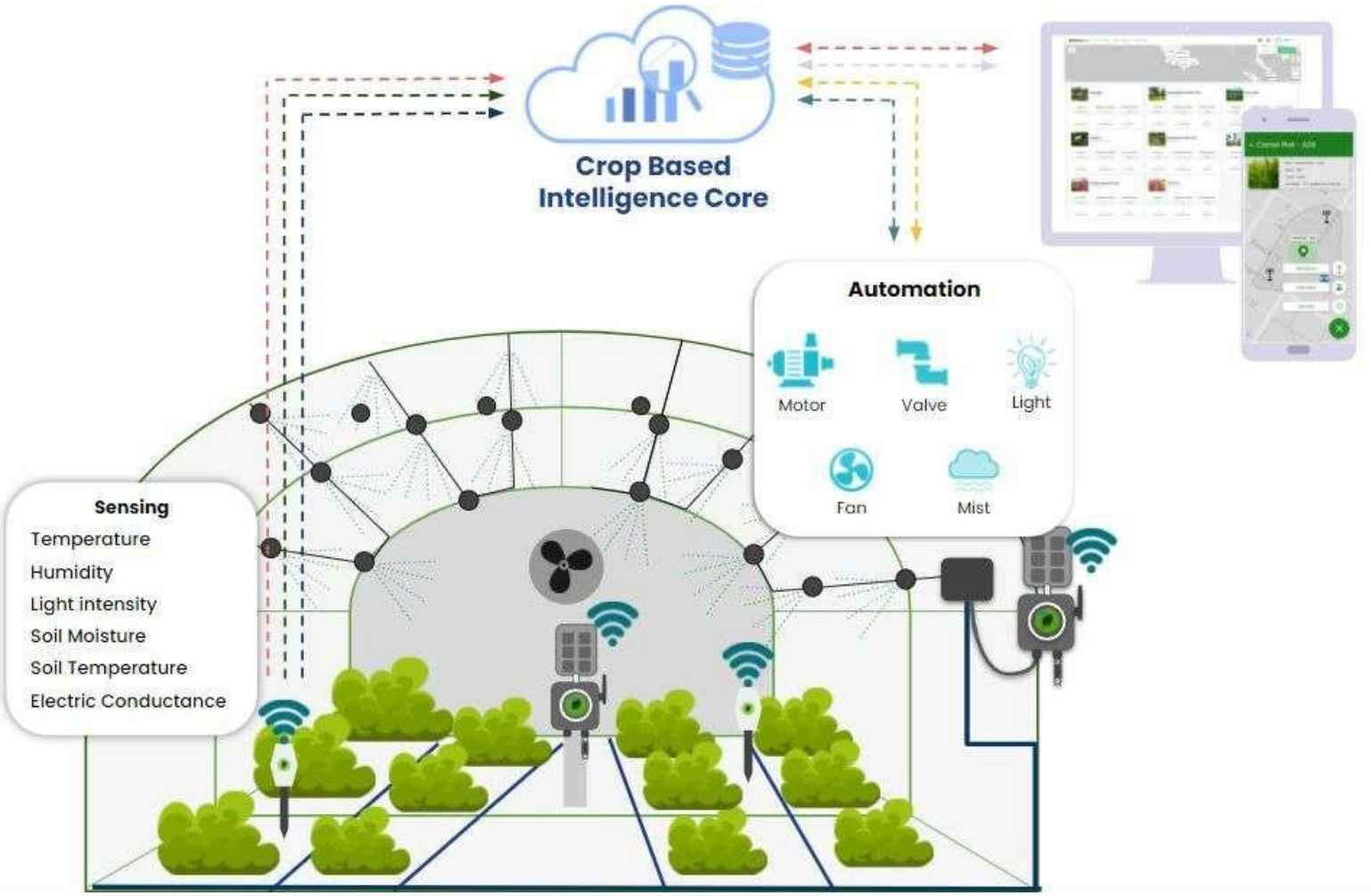


Building Crop-Specific Agronomic Intelligence for Berries

Monitor the microclimate parameters (Temperature, Humidity, Light intensity, Soil moisture, Soil conductivity) of the polytunnel and learn the crop-specific agronomic insights as well as decisions to build the crop-specific agronomic intelligence platform for berries. Hence, providing real-time agronomic instructions in the future.

- Maintaining the database of farms and farmers in the cloud.
- Updating the real-time agronomic decisions in the cloud
- Automating the irrigation system based on real-time microclimate parameter information.
- Sending real-time alerts on environmental condition violations and weather forecasts.
- Providing real-time agronomic instructions to the laborers once the crop-specific agronomic intelligence is built after a period of data learning.
- Gathering agricultural and fertigation practices information on the polytunnels.

Mobile Scouting and Tasks Management

Scout the polytunnel for potential threats to berries such as pests, diseases, weeds, and/or nutrient deficiencies via the mobile app. Further, managing the daily farm operations remotely via the AgriTechsplatform

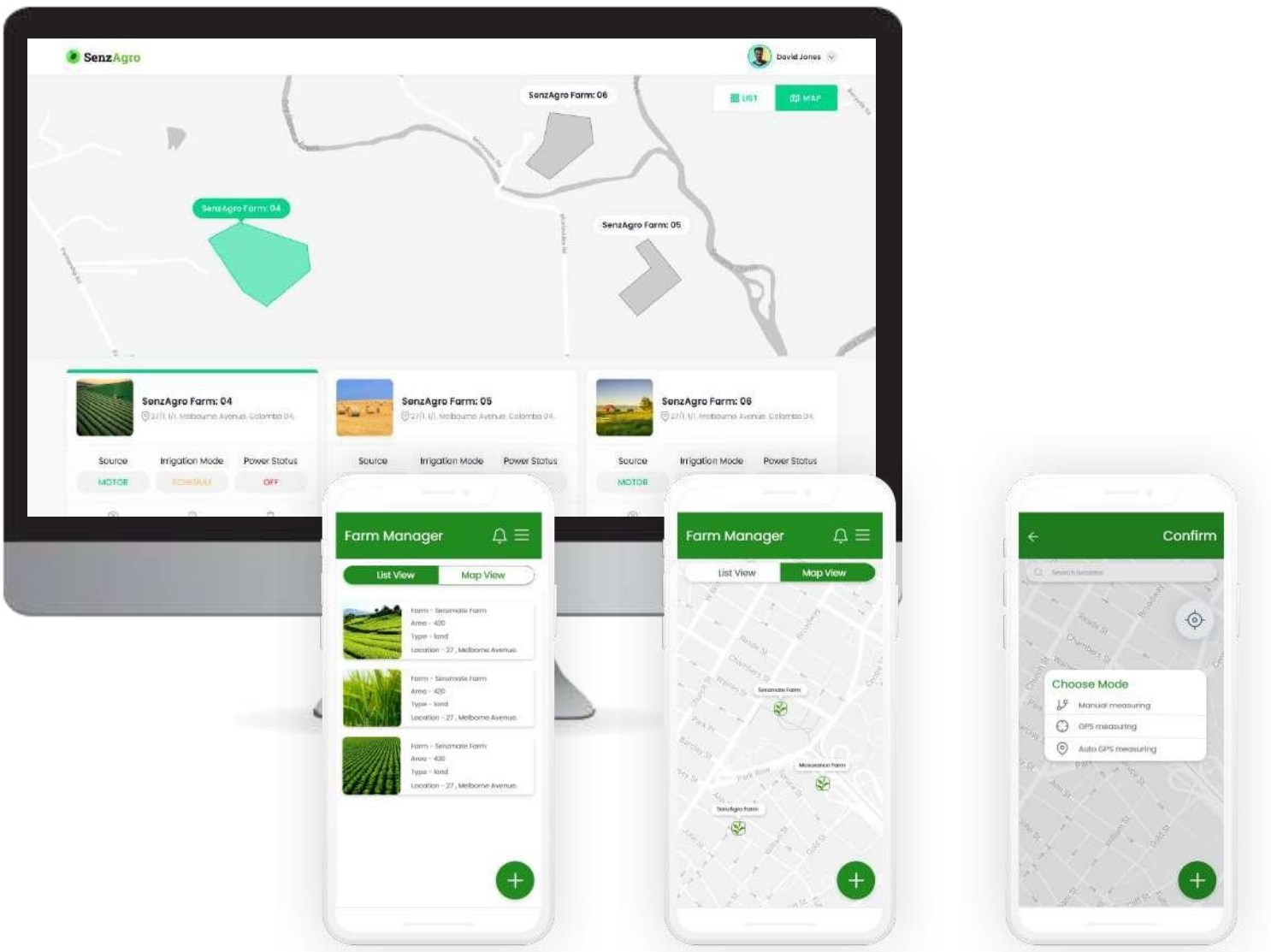
- Scout the polytunnel for pests, diseases, nutritional deficiencies, etc. using mobile
- Assigning responsibility to the laborer to take corrective actions on the scouting outcomes
- Assigning daily farm operational tasks to laborers remotely via mobile app, where the task instructions will be delivered to respective laborers via SMS.

Access your growth at any time, from anywhere!

The AgriTechs software system is accessible online, via laptop, tablet, and smartphone.

With our software, youcan:

- Record each of your crops via sensor-driven environmental history user-generated content and our easy-to-understand charts and graphs.
- Monitor all major aspects of your grow room environment.
- Create custom settings for AgriTechs hardware to take over your grow equipment and adjust to your crop’sneeds.
- Send alerts for any problems that need your attention.
- Allow additional friends/workmates to access your platform and receive alerts with view-only access.
- Instantly receive AgriTechs software upgrades which include Artificial Intelligence and Machine Learning algorithms, to help you understand your crop like never before!



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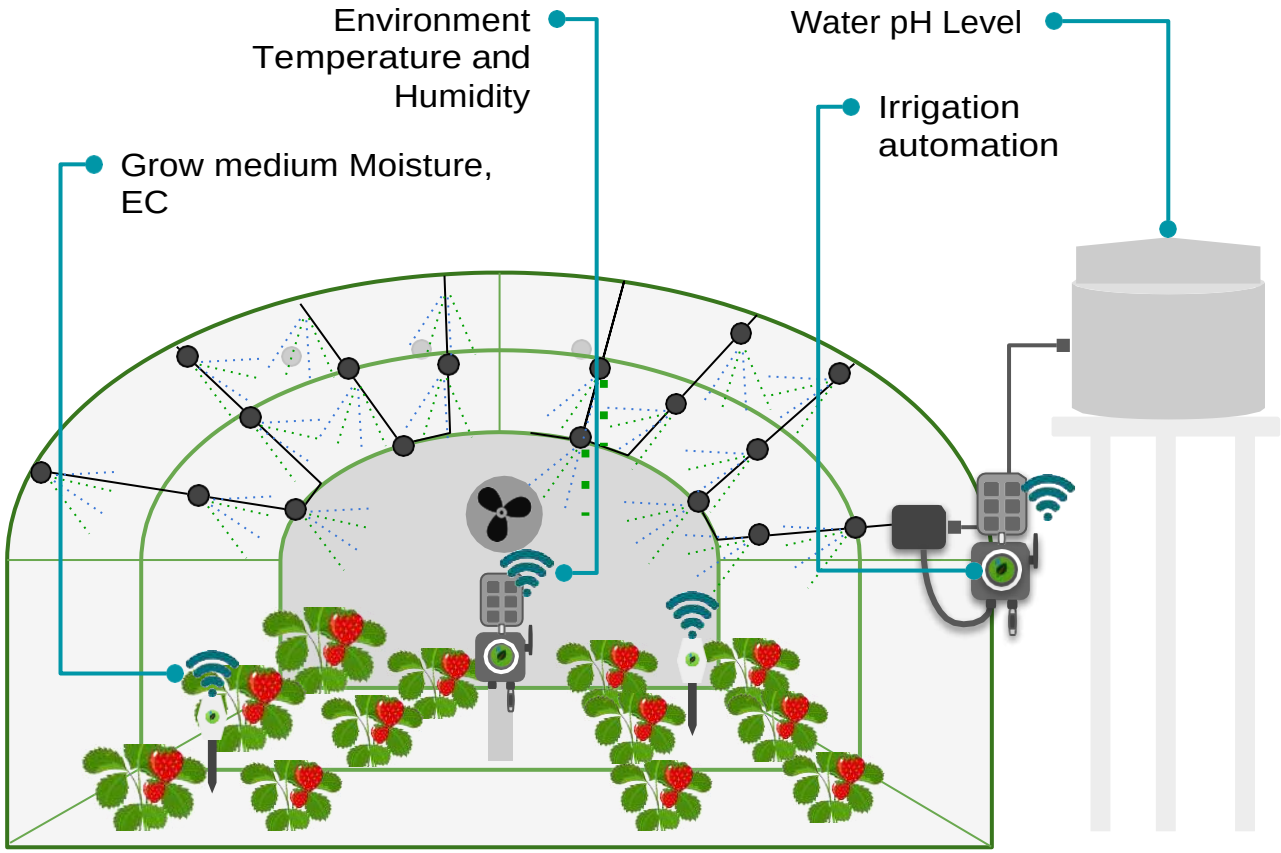
Polytunnel-based Strawberry cultivation.



Time, money, and quality savings

The investment in this controlling system can be easily returned in a couple of years and farmers have several advantages:

- They **save time** because they do not need to spend many minutes a day (hours a week!) in the field to control the crop status.
- They are **more confident** since their decisions are based on real data, which is constantly collected and elaborated from the system.
- They **save money and energy by** reducing water daily supply by up to 30% after planting and around 15% during harvest.
- They **decrease product losses** due to the presence of misshapen, plant collapse, and small fruit and rot, keeping a constant production of around 40 t/Ha.
- They maintain **high and constant quality standards** that increase the loyalty of the consumer and allow selling with a constant price all along the harvesting period (around 3.5-4.5 euro/kg for products directly sold).

CURRENT DEPLOYMENTS IN BORALANDA

The only global impact
Award-winning
Ag tech Company in the UK!

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