RESURGENT AGRIC

Overview of Tech in Agri and Food Sector

1. What is Agri Tech?

AgriTech or Agricultural technology or agro technology is the use of technology and technological innovation in farming with the aim of improving yield, efficiency, and profitability. While most commonly used in horticulture and agriculture, agri-tech is also found in forestry, aquaculture and viticulture. Put simply it is the application of technology to improve all elements of the farming and growing process to achieve faster planting, modified crops that grow well in different environments, and harvesting. Agricultural technology can be products, services or applications derived from agriculture that improve various input/output processes.

Agri-tech aims to improve farming through information monitoring and analysis of weather, pests, soil and air temperature. Agri-tech also includes the use of automation, such as controlling heaters and irrigation and employing pest control through aerosol pheromone dispersal.

The agriculture industry faces a lot of challenges – most of which are quite significant in terms of the impact on the future of the planet. These include –

Land Management, Climate Change, Resource Depletion, Increasing Carbon Footprint, Bio-Diversity, etc.

The application of Agritech can be to grow more food from less space, or using less water. It can be the use of robots to replace manual labour for planting or picking crops. It can also be the use of big data, machine learning and AI to understand more about the soil or growing conditions to improve yield.

The overall concept of agritech is to help grow things quicker, more efficiently and with greater yields, whether they be in the field, in the garden or in the sea.

2. What are different types of AgriTech ?

Different types of AgriTech are:

a) Smart Farming

b) Precision Farming

c) Robotics & Automation

d) Vertical Farming

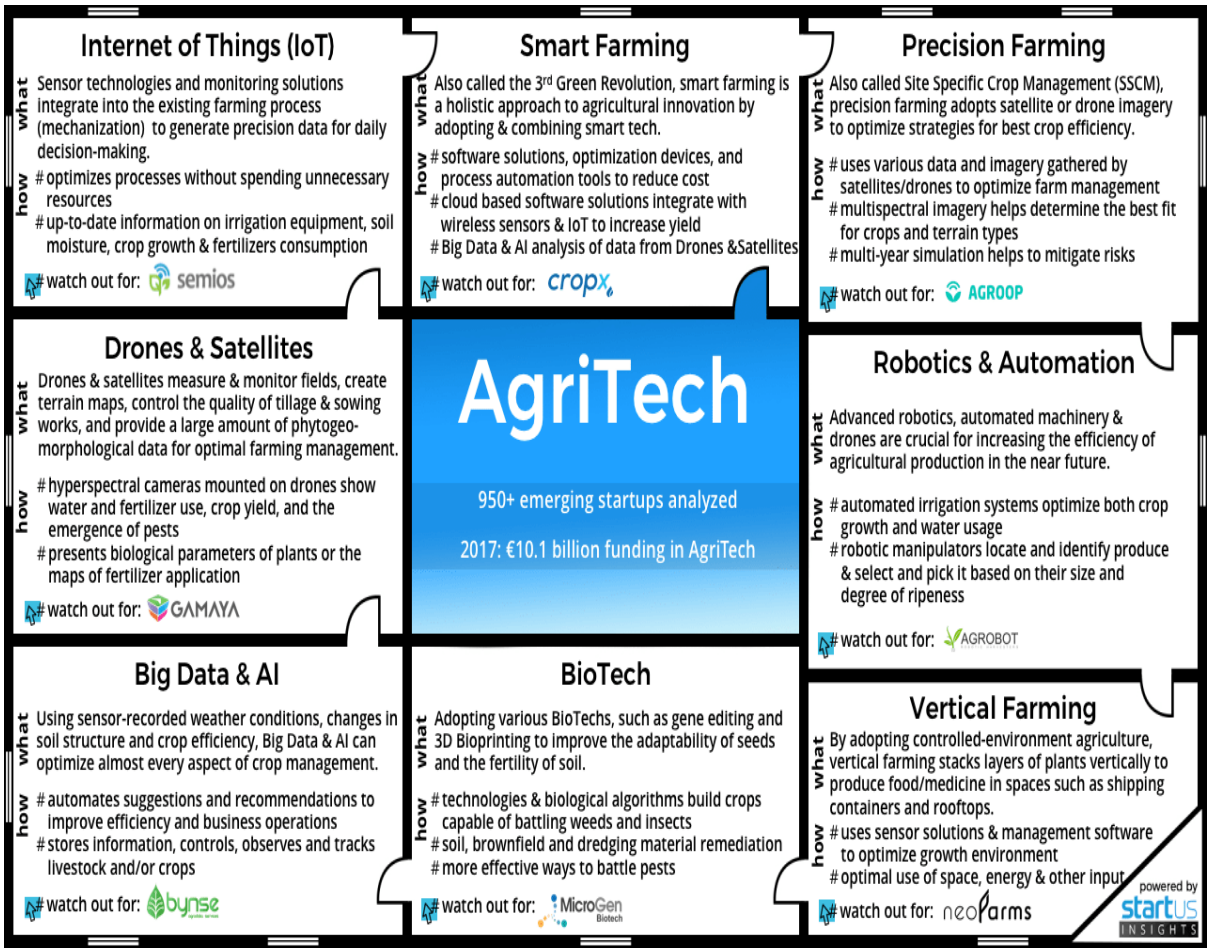
e) BioTech

f) Big Data & Artificial Intelligence (AI)

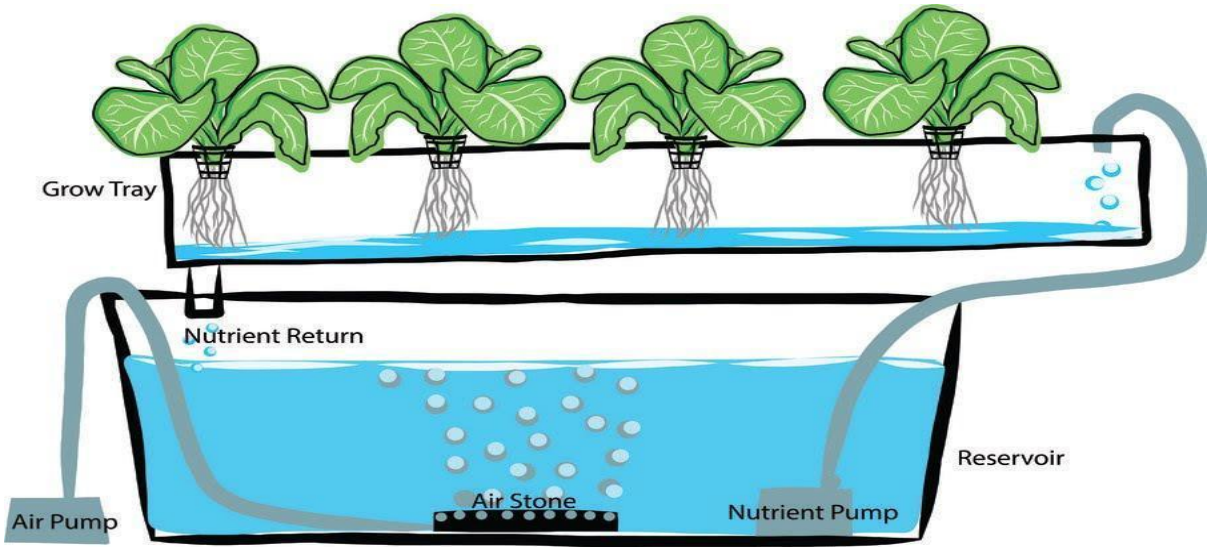
g) Drones & Satellites

h) Internet of Things (IoT)

i) Hydroponics



Hydroponics is a type of horticulture and a subset of hydro-culture, which is a method of growing plants, usually crops by using mineral nutrient solutions in an aqueous solvent. The nutrients used in hydroponic systems can come from many different sources, including (but not limited to) fish excrement, duck manure, purchased chemical fertilizers, or artificial nutrient solutions. Hydroponics offers many advantages, one of them being a decrease in water usage for agriculture.



3. AI in Agriculture:

Agriculture and farming is one of the oldest and most important professions in the world. As the world population continues to grow and land becomes scarcer, people have needed to get creative and become more efficient about how we farm, using less land to produce more crops and increasing the productivity and yield of those farmed acres. Now the industry is turning to AI technologies to help yield healthier crops, control pests, monitor soil and growing conditions, organize data for farmers, help with workload, and improve a wide range of agriculture-related tasks in the entire food supply chain.

3.1 Application of AI:

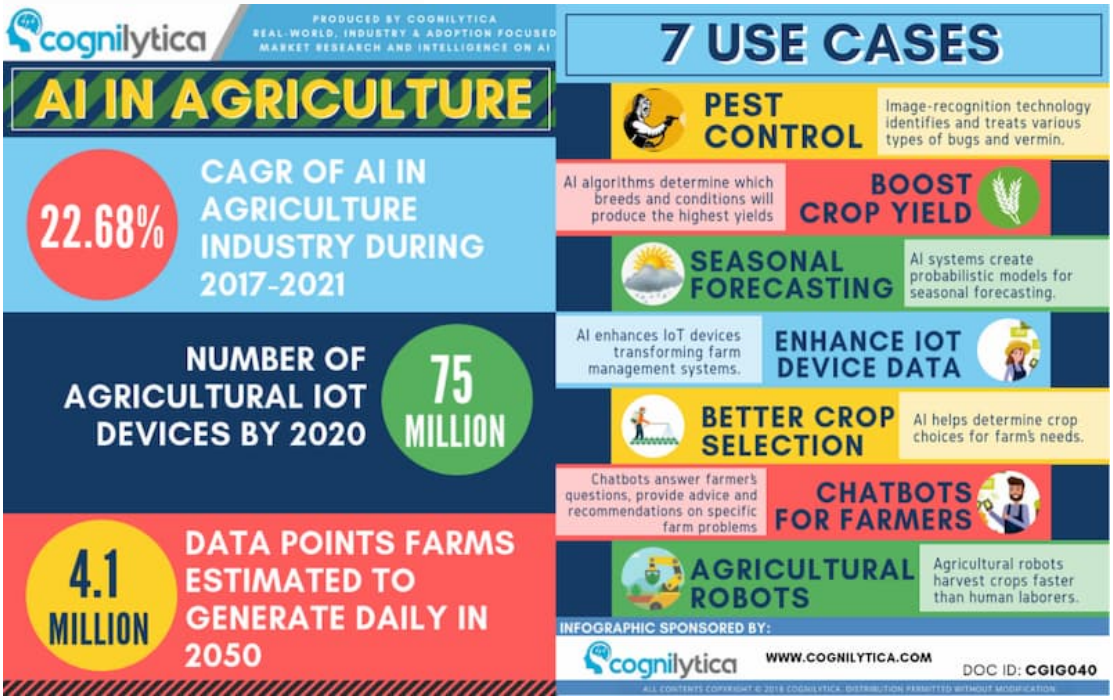
1) **AI helping analyze farm data:** Farms produce hundreds of thousands of data points on the ground daily. With the help of AI, farmers can now analyze a variety of things in real time such as weather conditions, temperature, water usage or soil conditions collected from their farm to better inform their decisions. For example, AI technologies help farmers optimize planning to generate more bountiful yields by determining crop choices, the best hybrid seed choices and resource utilization.

   AI is also used to create seasonal forecasting models to improve agricultural accuracy and increase productivity.

In addition to ground data, farmers are also taking to the sky to monitor the farm. Computer vision and deep learning algorithms process data captured from drones flying over their fields. From drones, AI enabled cameras can capture images of the entire farm and analyze the images in near-real time to identify problem areas and potential improvements.

2) **AI tackles the labor challenge: W**ith less people entering the farming profession, most farms are facing the challenge of a workforce shortage. Traditionally farms have needed many workers, mostly seasonal, to harvest crops and keep farms productive.

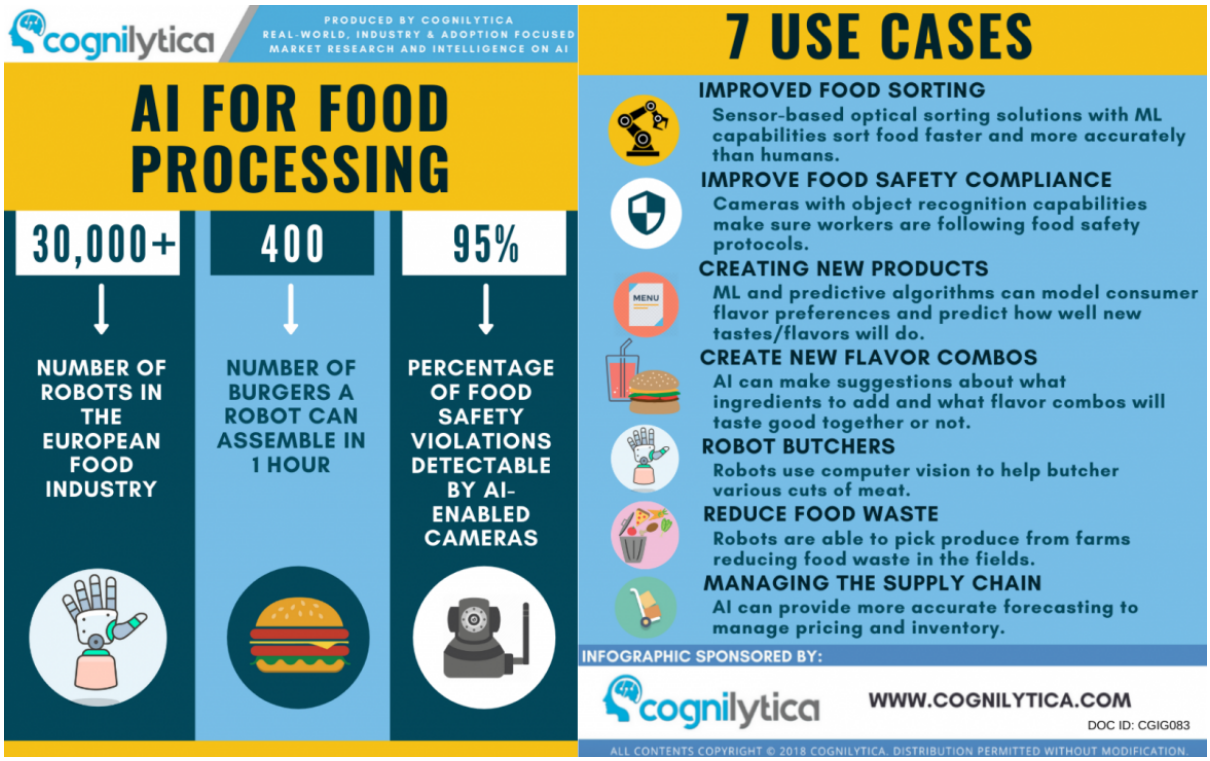
One solution to help with this shortage of workers is AI agriculture bots. These bots augment the human labor workforce and are used in various forms. These bots can harvest crops at a higher volume and faster pace than human laborers, more accurately identify and eliminate weeds, and reduce costs for farms by having a round the clock labor force. Through the use of AI and cognitive technologies farms across the world are able to run more efficiently, with less workers than before while still meeting the world's food needs.



Food processing is one of the major manufacturing sectors. For the most part, the sector is a very high volume, low margin industry. Finding new ways to gain even modest increases in efficiency can make the difference between a facility turning a profit or a loss. This is why some of the largest food processing companies are turning to artificial Intelligence technology in attempts to improve numerous aspects of the process.

AI applications are relatively specific to food processing and preparation, but there are many more general uses of AI that directly and indirectly have an impact on the industry. Few of the main applications are:

1. Sorting products and packages
2. Food safety compliance
3. Improved cleanliness
4. Produce development
5. Marketing



4.World-Top 10 world best known AgriTech companies using Artificial Intelligence

1. **Blue River Technology**

   Specialisation - Weed Control

   URL - http://www.bluerivertechnology.com/

   Main Phone: +1 (408) 733-2583

   CEO - Jorge Heraud

2. **Harvest CROO Robotics**

   Specialisation - Crop Harvesting

   URL - https://harvestcroo.com/

   Main Phone: (813)498-4278

   CEO – Grey Wishnatzki and Paul Bissett

3. **PEAT**

Specialisation - Machine Vision for Diagnosing Pests / Soil Defects

URL - https://peat.technology/

Main Phone: +49 - (0)176 43537145

CEO - Simone Strey

4. **Trace Genomics**

Specialisation - Machine Learning for Diagnosing Soil Defects

URL - https://tracegenomics.com/

Main Phone: +1 650-332-6661

CEO – Dan Vradenburg

5. **SkySquirrel Technologies Inc.**

Specialisation - Drones and Computer Vision for Crop Analysis

URL - https://www.f6s.com/skysquirreltechnologiesinc

Main Phone: 1-902-442-0742

CEO – Richard van der Put

6. **awhere**

Specialisation- Satellites for Weather Prediction and Crop Sustainability

URL - https://www.awhere.com/

CEO – John Corbett

7. **FarmShots**

Specialisation- Satellites for Monitoring Crop Health and Sustainability

URL - http:// farmshots.com/

Main Phone**:** (954) 729-3963

CEO – Joshua Miller

8 **Abundant Robotics**

Specialisation- Apple Harvesting Technology

URL - https://www.abundantrobotics.com/

Main Phone:

CEO – Dan Steere

9. **Ibex Automation**

Specialisation- Agricultural Robot Systems

URL - https://www.ibexautomation.co.uk/

Main Phone: 519-949-4394

CEO – Mark De Groot

10. **Hortau Inc**

Specialisation- Web-Based Irrigation Management System

URL - https://hortau.com/

Main Phone: (805) 545-5994

CEO – Jocelyn Boudreau

5.) Top 5 Indian Agri Tech Companies using Artificial intelligence

1. Satsure: url: https://www.satsure.co/

CEO- Amardeep Sibia

2. Fasal url: https://fasal.co/

CEO- Ananda Verma

3. Aibono url: http://www.aibono.com/

CEO- Vivek Rajkuma

4. Gobasco url: https://www.gobasco.co/

CEO- Vedant Katiyar

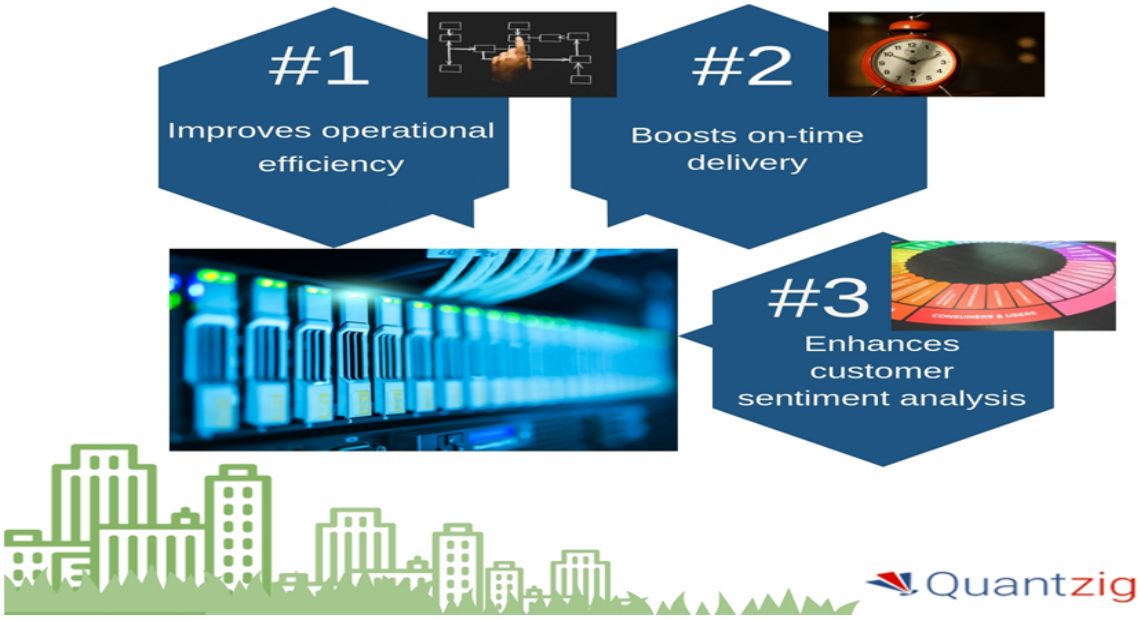
5. Cropin url: https://www.cropin.com/

CEO- Krishna Kumar

6) Data Analytics in Agri and Food Tech

Data analysis is changing the way farmers and agricultural professionals have been making decisions. Modern technology has made it possible to collect data of soil, water, and minerals from farms, and store them in a centralized system, popularly known as the Internet of Things (IoT). Such data can be combined with data from external sources such as satellites, weather stations and even data from neighbouring farms to form a bigger volume. Data analytics can be used in the accumulated bulk to obtain information which can be used by farmers to optimize their farming. In food industries, Data science and analytics help build transparency within supply chains, so they can be more honest with their customers. Transparency also helps in solving problems and increasing efficiency in supply and logistics. Data science and analytics allows organisations to protect food health and cross-contamination.

Benefits of data analytics in food technology



7) World- Top 10 world best known AgriTech companies using Data Analytics

1. Mothive	Making farms visible and predictable for farmers and all actors in supply chain. url: https://www.mothive.com/ CEO- Brendan Smith
2. CropX	An AG analytics company leading the farmers into the era of connected soil.

url: https://www.cropx.com/

CEO- Tomer Tzach

3. Arable An an agricultural data and analytics company that offers the world's first IoT-enabled irrigation management tool, weather station, and crop monitor in one, the Arable Mark.

url: https://www. arable.com/

CEO- Jim Ethington

4. Ceres imaging An aerial spectral imagery company that helps growers optimize their water and fertilizer application.

url: https://www.ceresimaging.net/

CEO- Ashwin Madgavkar

5. Gamaya Early detection of disease and pests, detection and diagnostics of stress

url: http://gamaya.com/

CEO- Mathieu Hagen

6. Agridata Digitalizes agriculture by providing farmers with the information they need to manage to their field.

url: https://www.agridatainc.com/

CEO- David Hagert

7. **Agrowatcher** Uses computer vision technology to identify and detect water stress, pests, infestation, and diseases.

url: http://ww1.agrowatcher.com/

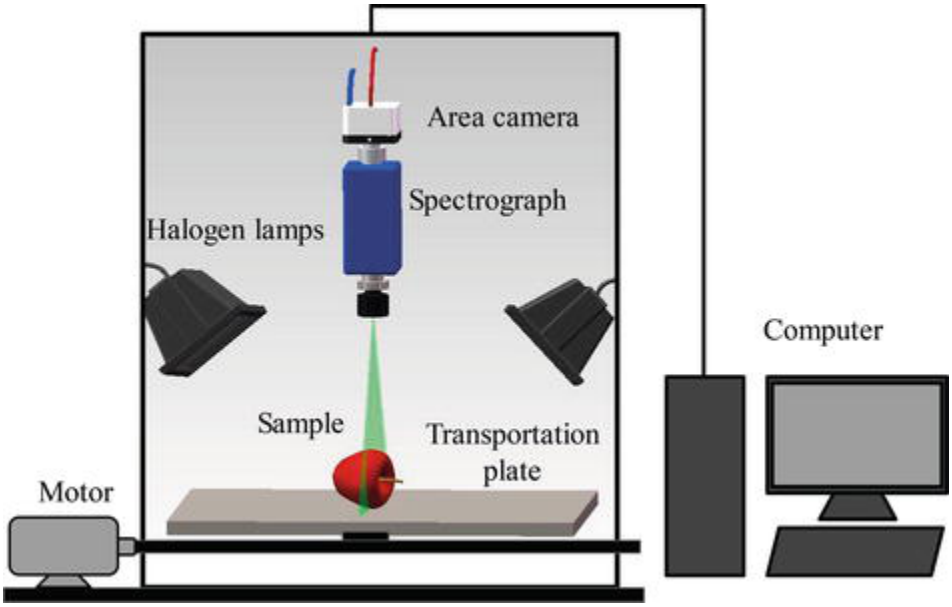
CEO- elad orbach

8 AgEagle A drone-enabled software company that provides advance imaging analysis for precision agriculture

	url: https://www.ageagle.com/ CEO- Michael Drozd
9. PrecisionHawk	Offers an end-to-end solution for aerial data gathering, processing and analysis. url: https://www.precisionhawk.com/ CEO- James Norrod
10.Aker Technologies Inc	An agriculture data company providing crop intelligence and in-season analytics. url: https://aker.ag/ CEO- Orlando Sae

8) The Hyperspectroscopy in Agri and Food Tech

Hyperspectral imaging or imaging spectroscopy is a novel technology for acquiring and analysing an image of a real scene by computers and other devices in order to obtain quantitative information for quality evaluation and process control. Hyperspectral imaging has attracted much research and development attention, as a result rapid scientific and technological advances have increasingly taken place in food and agriculture, especially on safety and quality inspection, classification and evaluation of a wide range of food products, illustrating the great advantages of using the technology for objective, rapid, non-destructive and automated safety inspection as well as quality control.



9. World- Top 10 world best known AgriTech companies using hyperspectroscopy

1. FluroSat FluroSat uses satellites, drones, and some aerial imagery, to capture and analyze hyperspectral images of crops to predict disease and help growers make decisions.

url: https://flurosat.com/

CEO - Anastasia Volkova

2. Gamaya Develops a farming management solution using hyperspectral imaging and data analysis.

url: https://gamaya.com/

CEO - Mathieu Hagen

3. FruitSpec Scan the trees in an orchard, counting and map out the number of fruit still ripening up behind their leaves, as well as estimating fruit sizes.
url: https://www.fruitspec.com/

CEO -Raviv Kula

4. ChrysaLabs Soil Mapping, measure soil nutrients, pH, moisture, and organic matter.
url: https://www.chrysalabs.com/

CEO - Samuel Fournie

5. Fotenix	Crop Analytics url: https://fotenix.tech/ CEO - Charles Veys
6. Polariks	Quality Monitoring, help vineyards improve their harvest url: https://www.polariks.com/ CEO - Scott Wine
7. BharatRohan	Drone-based hyperspectral solutions for precision agriculture, pick up physiological changes that are not visible. url: http://bharatrohan.in/ CEO - Amandeep Panwar

10. Top 5 Indian Agri Tech Companies using hyperspectroscopy

1. TartanSense	Analyzing health of plants using drones url: http://www.tartansense.com/ CEO - Jaisimha Rao
2. BharatRohan	Drone-based hyperspectral solutions for precision agriculture, picks up physiological changes that are not visible yet. url: http://bharatrohan.in/ CEO - Amandeep Panwar
3. Agricx Lab	Quality analysis from an image of the product sample url: http://agricx.com/ CEO - Saurabh

11. Machine Learning in Agri and Food Tech

Machine learning is everywhere throughout the whole growing and harvesting cycle. It begins with a seed being planted in the soil — from the soil preparation, seeds breeding and water feed measurement — and it ends when robots pick up the harvest determining the ripeness with the help of computer vision. Machine learning algorithms can also be used to differentiate between weeds and crops. GPS-enabled automated tractors can be used for efficient ploughing, tilling and planting. It has emerged together with big data technologies and high-performance computing to create new opportunities to unravel, quantify, and understand data intensive processes in agricultural operational environments.

In food industries, there are many areas where machine learning is used. Machine Learning solutions offer many possibilities to optimize and automate processes, save money,

and reduce human error for many industries. AI and ML can benefit restaurants, bars, and cafe businesses as well as in food manufacturing. It also helps in food delivery and goods tracking at every step, making it safer and providing transparency. Also, it makes pricing and inventory forecasts, which prevents extra costs. The areas where machine learning is used in food industries are:

1. Supply chain optimization – less waste and more transparency
2. Sorting food: optical sorting solutions
3. Predictive maintenance, remote monitoring, and condition monitoring
4. Analytical solutions for a better customer experience
5. Food-selling sites and applications
6. Revenue Prediction Using Machine Learning

12. World- Top 10 world best known Agri Tech companies using Machine Learning

1. Beriqo Their analysis enables decision making in precision agriculture by identifying parameters such as underperforming fields, nutrient deficiency, pest damage, and missed fertilizer stripes.

url: https://www.beriqo.com/

CEO -

2. AbuErdan Livestock Monitoring
url: https://abuerdan.com/

CEO - Islam Khalil

3. Klimazone Climate Recipes
url: https://klimazone.io/

CEO - Frederik Bussler

4. Bilberry Intelligent Spot Spraying System
url: https://bilberry.io/

CEO - Guillaume Jourdain

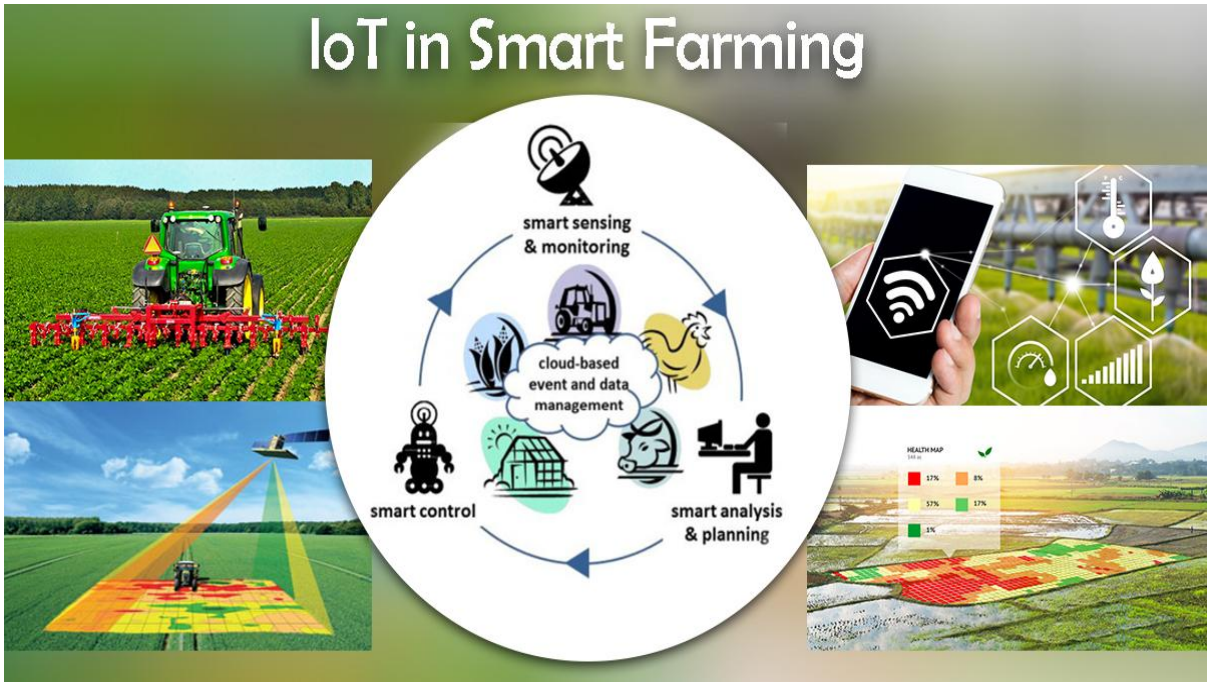
5. AgroScout Image-Based Anomaly Detection
url: https://agro-scout.com/

CEO - Simcha Shore

13. The IoT in Agri and Food Tech

The Internet of Things refers to smart devices that are capable of transferring information on a network. From disease control measures to cattle and field monitoring systems, IoT is

transforming the industry of agriculture by putting the power back where it belongs. Internet of things is making manned machine navigation a thing of the past. Farmers can remotely control their tractors, rotavators, and a host of agricultural machinery with a smartphone. With the Internet of Things technology, farmers could grow high-value crops at scale than hedge their bets with varieties supported by minimum support prices. Another way by which the agriculture is scaling its appetite for the Internet of Things is by installing on-field sensors. By design, sensors are engineered to detect discrepancies in weather conditions, crop nutrition, soil pH, and more.



The food manufacturing industry is high on the deployment of the Industrial Internet of Things (IIoT). The two most suited application areas of IoT that have emerged so far are manufacturing and packaging. The benefits of IoT in the F&B industry are in the following sections,

1. Warehouse Management - The stock loading times are optimized, managers maintain a magnified vigil on supply chains, due to which the storage space is fully taken advantage of.

2. Vision Picking - Vision picking marries the internet of things with the food industry helping humans identify the right storage zones.

3. Product Authenticity Labels - Internet-enabled microchips vaporate doubts over the authenticity of the product.

4. Smart Sensors - sensors that indicate not just the veracity of quality but whether the sealing has been broken or not, the source of its ingredients

5. **Remotely Controlled Storage Units** - create handheld smart controllers with which the user could moderate storage environment without physical presence.

14. World- Top 10 world best known Agri Tech companies using IoT

With the use of AgTech these ten companies are making agriculture smarter than ever using **IoT** while carrying on a great cultural legacy:

1. **Cowlar**

   Cowlar monitors the vital signs of cattle and allows for ranchers to adjust the diet and living conditions until the animal is happy.

   url: https://www.cowlar.com/

   CEO - Akshay Mehrotra

2. **Hortau**

   A wireless soil and irrigation management platform that integrates with ST field monitors which can connect to irrigation infrastructure to perform tasks such as starting pumps on-demand, based on a schedule, or based on soil conditions.

   url: https://hortau.com/

   CEO - Jocelyn Boudreau

3. **FieldIn**

   Combines sensors and efficiency logs to give farm investors and workers actionable insights into the farm's operation.

   url: https://fieldin.com/

   CEO -

4. **Pycno**

   Offers wireless, modular soil sensors for use in determining what the soil needs so that farmers can use only the fertilizer and other additives they need in order to reduce waste.

   url: https://pycno.co/

   CEO - Marios Georgiou

5. **The Yield**

   Offers a free app that helps users remain aware of the weather conditions (rainfall, evapotranspiration, etc.).

   url: https://www.theyield.com/

CEO - Milind Mehere

6. **Agrosmart**

   Helps farmers monitor more than 10 environmental conditions so that they can make more educated decisions about how to allocate their resources and deal with pests.

   url: https://agrosmart.com/

   CEO - **Mariana Vasconcelos**

7. **Grownetics**

   Assists with the installation of indoor crop monitoring equipment to maximize growing efficiency.

   url: https://abuerdan.com/

   CEO - Eli Duffy

8. **HerdDogg**

   A smart eartag producer for keeping up with livestock and their conditions.

   url: https://www.herddogg.com/

   CEO - Louis Faust

9. **Amber Agriculture**

   Allows farmers to manage their stored crops to ensure they receive the maximum price per unit for their sales. Amber is a solution for storing crops after harvest when a significant amount of product tends to be lost.

   url: https://www.amber.ag/

   CEO - Lucas Frye

10. **SciCrop**

    Focuses the utility of big data and smart farming technology into an actionable dashboard of information. Features are all driven by data in real-time for the best possible performance.

    url: https://scicrop.com/

    CEO – Jose Damico

15. India Top 5 Indian Agri Tech Companies using IoT

Top Indian Agritech companies using IoT to make farming profitable are

1. **Fasal**

   Helps farmers through its AI-powered IoT-SaaS platform which captures real-time data on growing conditions from on-farm sensors and delivers farm-specific, crop-specific actionable advisories to farmers via mobile in vernacular languages.

   url: https://fasal.co/

   CEO- Ananda Verma

2. **QZense**

   Using IoT to build solutions for quick and accurate grading of fresh food, by capturing insights on ripeness, spoilage, and shelf life that assists farmers capture higher margins from the same produce.

   url: https://www.qzense.com/

   CEO- Rubal Chib

3. **DeHaat**

   Working 24/7 to support smallholder farmers in Bihar, UP, Odisha, and Jharkhand by offering them a one-stop solution on crops to grow, how to grow and where to sell the produce under one roof in an accessible and affordable way.

   url: https://agrevolution.in/company

   CEO- Shashank Kumar

4. **Bijak**

   Helping rural commodity traders and buyers transition to digital commerce, while greenhouse agritech platform

   url: https://www.bijak.in/

   CEO- Mahesh Jakhotia

5. **Clover**

   Able to channel a lot of these farmers into its network for serving the end consumer demand in a traceable, hygienic manner.

   url: https://www.clover.com/

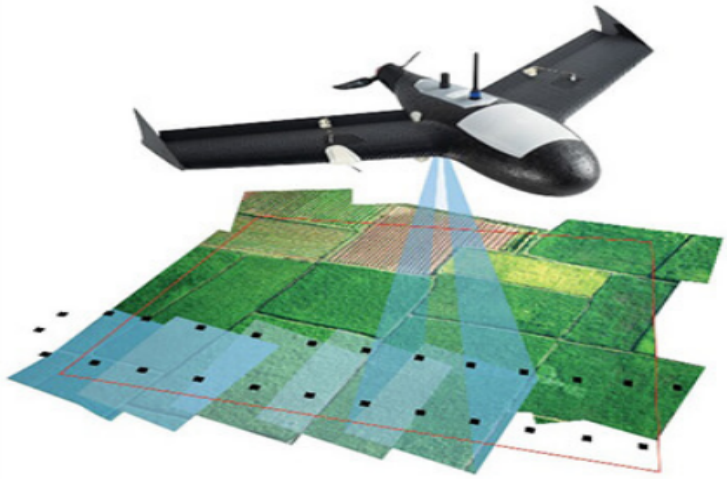
   CEO- Avinash B R

16. Drones in Agri and Food Tech

Drones are small and light aerial vehicles which may fly at extremely high altitudes and carry various **navigation systems or recording devices such as RGB cameras, infrared**

cameras, and other sensors. Due to their ability to deploy various sensors and capture high-resolution and low-cost images of crop conditions, drones are very useful in farming. Images can be used to assess different aspects of plant health, weeds, and assets. **Drones collect raw data and translate it with algorithms into useful information.** Drones help farmers optimize the use of inputs such as seeds, fertilizers, water, and pesticides more efficiently. Therefore, they can be used for various applications in farming, such as the monitoring of the following parameters:

1. Crop health; damage made by pests, color change due to pest infection
2. Vegetation indices; leaf area, anomaly detection, treatment efficacy, phenology, yield
3. Plant height; plant height and density
4. Plant scouting; plant size, plot statistics, stand number, compromised plots, planter skips
5. Water needs; water-stressed parts of the field/orchard in need of watering
6. Soil analysis; nutrient availability for plant nutrient management



Drone flying over the field and collecting images

Drones are ideal alternatives when it comes to performing cost-intensive tasks in the food industry e.g. provide visual overview of the production site, carry out condition control, performs leakage detection and cleaning validation of equipment. The use of drones offers advantages such as:

1. quick overview of the production site and the state of the equipment
2. sharp and detailed images and video of defects and failures
3. data and insights useable in the maintenance planning
4. access to hard to reach areas
5. reduced downtime and optimised production
6. High level of safety.

17. World- Top 10 world best known Agri Tech companies using Drones

1. Gamaya: Precision farming solutions using HSI technology deployed on drones.

url: https://gamaya.com/

CEO- Mathieu Hagen

2. Raptor Maps provides drone based service for capturing of farm data and also provides an analytics platform for decision support to the farmers.

url: https://raptormaps.com/

CEO- Nikhil Vadhavkar

3. Hummingbird Technologies Provides services for on-demand aerial imagery capturing, image processing, and data analytics to the agriculture industry.

url: https://hummingbirdtech.com/

CEO- Will Wells

4. Agribotix Provides data processing and analysis for precision agriculture.

url: https://agribiotix.com/

CEO- Lou Faust

5. Deveron UAS Provides aerial imagery services for crop planning.

url: https://deveronuas.com/

CEO- David MacMillan

6. **Skycision** Provides aerial survey and mapping services targeted towards agriculture

url: https://angel.co/company/skycision

CEO- Brendan Carroll

7. GreenSight Agronomic developed a drone enabled water and chemical management for reductions in water, pesticide, and fertilizer usage.

url: http://www.greensightag.com/

CEO- James Peverill

8. Aker Digital platform for crop monitoring and directed scouting.

url: https://www.akersolutions.com/

CEO- Luis Araujo

9. TartanSense	Analyzing health of plants using drones. url: http://www.tartansense.com/ CEO- Jaisimha Rao
10. Aerobotics	Provides early pest and disease detection solution guided by drone and satellite imagery. url: https://www.aerobotics.com/ CEO- James Paterson

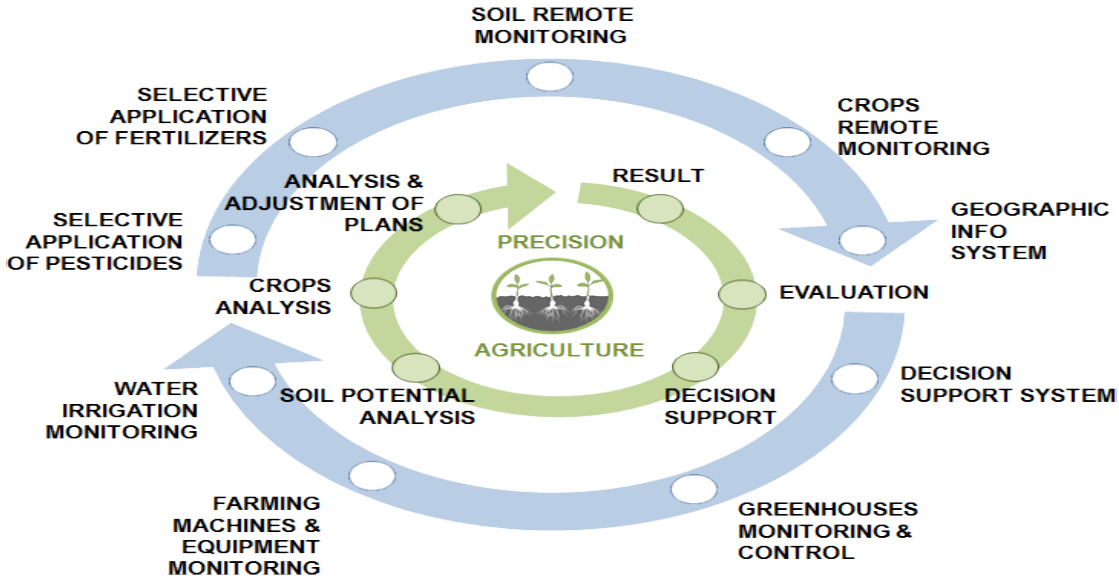
18. India Top 5 Indian Agri Tech Companies using Drones

1. **Fasal**	url: https://fasal.co/ CEO- Ananda Verma
2. **Werobotics**	Drone-based technologies on their lands and orchards for remote sensing the data. url: https://werobotics.org/ CEO- Patrick Meier
3. **Garuda Aerospace**	Garuda is using its drones for the purpose of pesticide spraying to help farmers in improving the efficiency and productivity of crops. url: https://www.garudaaerospace.com/ CEO- Vimal Raj
4.Airwood	It has developed custom drones that gather field data which farmers can leverage using Airwood's farm management dashboards url: http://www.airwood.in/ CEO- Vivek Rajkumar
5.Indrones	GIS mapping, precision agriculture, monitoring and inspection of infrastructure. url: https://www.indrones.com/ CEO- Pravin Prajapati

19. Precision Agriculture in Agri and Food Tech

Precision agriculture (PA), satellite farming or site specific crop management (SSCM) is a farming management concept based on observing, measuring and responding to inter and intra-field variability in crops. The goal of precision agriculture research is to define a decision support system (DSS) for whole farm management with the goal of optimizing returns on inputs while preserving resources. A key component of this farm management approach is the use of information technology and a wide array of items such as GPS guidance, control systems, sensors, robotics, drones, autonomous vehicles, variable rate technology, GPS-based soil sampling, automated hardware, telematics, and software. The goal of precision farming is to improve agricultural yield and reduce potential environmental risks, while benefits are:

- Monitor the soil and plant physicochemical parameters
- Obtain data in real time: offer real time data ensuring an updated status of the field and plant parameters at all time
- Provide better information for management decisions
- Save time and costs: reduce fertilizer and chemical application costs, reduce pollution through less use of chemicals
- Provide better farm records essential for sale and succession
- Can be integrated with farm management softwares, like Agrivi, to make all activities on farm more easy and to improve farm productivity



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	CEO- Elad orbach
8 AgEagle	A drone-enabled software company that provides advance imaging analysis for precision agriculture url: https://www.ageagle.com/ CEO- Michael Drozd
9. PrecisionHawk	Offers an end-to-end solution for aerial data gathering, processing and analysis. url: https://www.precisionhawk.com/ CEO- James Norrod
10.Aker Technologies Inc	An agriculture data company providing crop intelligence and in-season analytics. url: https://aker.ag/ CEO- Orlando Sae

21. India Top 5 Indian AgriTech Companies using Precision Agri

1. Trimble	url: https://www.trimble.com/ CEO- Robert Painter
2. Tata Kisan Kendra	url: CEO-
3. Fasal	url: https://fasal.co/ CEO- Ananda Verma
4. Cultyvate	url: https://www.cultyvate.com/ CEO- Mallesh T M
5. CropIn	url: https://www.cropin.com/ CEO- Krishna Kumar

22. Sustainable /Traceable Agriculture in Agri and Food Tech

Sustainable Agriculture is the ability to produce enough food and commodities to meet present needs without endangering the environment, public health or economic profitability. As the population grows, so does the demand for food and resources, and farmers must find ways to increase production rates while remaining environmentally conscious. The goal of sustainable agriculture is simply to care for the environment, facilitate economic profitability, and create social and communal equity. There are a number of innovative solutions in agriTech that enforce sustainable farming. From evaluating soil health to managing water infrastructure, technology provides tools that help maintain healthy and environmentally-friendly yields with more precision and efficiency. Drones and other equipment are now able to conduct data analyses, and GPS-enabled tractors help plant crops more efficiently. Farm management software, yield mapping, digital markets and data solutions like block-chain contribute to a sustainable future by offering both farmers and consumers efficiency, traceability and immutability.

23. Top 10 world best known Agri Tech companies using sustainable Agriculture

1. **Atos** url - https://atos.net

   CEO - Elie Girard

2. **Perfect Day Foods** url - http://www.perfectdayfoods.com/

CEO - Ryan Pandya

3. **Basf** url - http://www.basf.com

   CEO - Martin Brudermüller

4. **Impossible Foods** url - http://impossiblefoods.com/

   CEO - Pat Brown

5. **iGrow** url - https://www.igrow.asia/

   CEO - Andreas Senjaya

6. **ADM** url - http://www.adm.com/

   CEO - Luciano

7. **Connecterra** url - http://www.connecterra.io/

   CEO - Yasir Khokhar

8. **Geltor** url - http://geltor.com/

   CEO - Nick Ouzounov

9. **Apeel Sciences** url - http://www.apeelsciences.com/

   CEO - James Rogers

10. **Plenty** url - http://www.plenty.ag/

    CEO - Matt Barnard

24. India Top 5 Indian Agri Tech Companies using Sustainable

1. AgNext Builds data-driven value chains with the latest technologies that can transform the way we grow, procure, trade, store and consume food, benefiting all stakeholders of the agribusiness industry.

url: www.agnext.com

CEO - **Taranjeet Singh Bhamra**

2. CropIn Technology Solutions Uses ground, weather and satellite data to help agribusinesses de-risk their supply chains through real-time monitoring and making data-driven decisions

url: www.cropin.com

CEO - Krishna Kumar

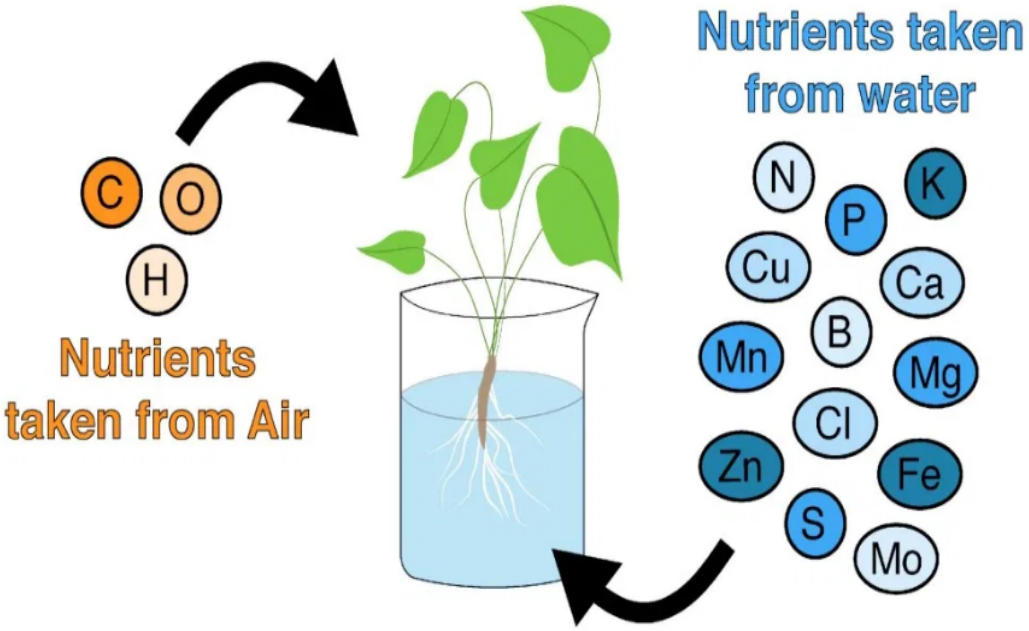
3. DeHaat	With a technology-enabled platform currently providing complete end-to-end services to more than 170,000 Indian farmers from "Seed to Market" with an aim to expand to a million by 2022. url: www.agrevolution.in CEO - Shashank Kumar
4. EM3 Agriservices	Breaking the stereotypes for increasing agricultural productivity by bringing technology and mechanization for farming communities on a Pay-for-Use basis. url: www.em3agri.com CEO - Adwitiya
5. FarMart	Helps smallholder farmers get access to low cost digital credit by linking credit to purchase of farm inputs at merchant points url: www.farmart.com CEO - Alekh Sanghera

25. Hydroponics Agriculture in Agri and Food Tech

Hydroponic System is a system of growing crops without soil, often called soilless farming. In the hydroponic system, the plant roots grow in a liquid nutrient solution or inside the moist inert materials like Rockwool and Vermiculite. The liquid nutrient solution is a mixture of essential plant nutrients in the water. The plant roots are suspended either in the static liquid solution or in a continuously flowing nutrient mixture. The hydroponic growing system requires continuous attention to the crops, unlike the traditional farming system.

Advantages of a hydroponic system

- Higher productivity than the traditional farming system, the plant nutrients are effectively used, and there is no wastage.
- The hydroponic system is a controlled climate system in which the crops can grow year-round.
- Water is utilization very high when compared to the traditional farming method, up to 80-90 percent higher.
- The crops are grown in a closed space, which eliminates the attack of pests and insects.



26. World- Top 10 world best known Agri Tech companies using Hydroponics agri

1. Aero Farm Systems Grow delicious, nutritious leafy greens and herbs without s unlight, soil, or pesticides.

url: http://aerofarms.com/

CEO - David Rosenberg

2. Freight Farms Uses old shipping containers to create a turnkey solution for creating food access around the world.

url: http://www.freightfarms.com/

CEO - Rick Vanzura

3. iBio url: http://www.ibioinc.com/

CEO - Thomas F

4. LettUs Grow url: https://lettusgrow.com/

CEO - Jack Farmer

5. Hydrofarm url: http://www.hydrofarm.com/

CEO - Bill Toler

6. American Hydroponics url: https://amhydro.com/

CEO - Michael Christian

7.Farmshelf url: http://farmshelf.com/

CEO - Andrew Shearer

8.GrowUp Urban Farms Uses aquaponics to produce high-quality salads, herbs, microgreens and fish on sustainable farms close to consumers. url: http://growup.org.uk/

CEO - Kate Hofman

9. Evogro Makes indoor plant growing systems for chefs – making it easy to grow perfect microgreens, salad leaves and herbs.

url: http://www.evogro.com/

CEO - Jason Hirst

10. EasyPonic Makes Nanny, a device and app that helps you taking care of hydroponic crops. Nanny has sensors that watch over the culture.

url: http://www.easyponic.com

CEO -

27. India Top 5 Indian Agri Tech Companies using Hydropnics Agri

1. Letcetra Agritech Goa's first indoor hydroponics farm, growing good quality, pesticide-free vegetables.

url: http://www.letcetraagritech.com/

CEO - Ajay Naik

2. BitMantis Innovations url: https://bitmantis.launchrock.com/

CEO - Prakash

3. Junga FreshnGreen url: https://www.jungafreshngreen.com/

CEO - Sandeep Bhatia

4. Future Farms Develops effective and accessible farming kits to facilitate Hydroponics that preserve environment while growing cleaner, fresher and healthier produce.

url: https://www.business.futurefarms.in/

CEO - Sriram Gopal

Conclusion

There is huge potential to be tapped in carrying out and managing agriculture in scientific manner .