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TIMSCDR Research Journal
Volume 8 2017-2018



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AIM

The research and development is transforming the computing paradigms and technology in multidimensional directions. Tech Tonics aims to inculcate research culture among post graduate students and make them aware of new innovations happenings in the field of information technology.

TECH TONICS

TIMSCDR Research Journal

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Thakur Institute of Management Studies, Career Development and Research will become a premier Institute renowned internationally for providing education in Software Application to graduates from various disciplines.

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9. Effectively communicate technical information, both oral and written with range of audience.
10. Analyze societal, environmental, cultural and legal issues within local and global contexts when providing software solutions.
11. Work as a member or leader in diverse teams in multidisciplinary environments.
12. Use Innovation and Entrepreneurship for creation of value and wealth.

Tech Tonics: TIMSCDR Research Journal, Volume 8, 2017-2018

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Editorial

The eight volume of the Research Journal, Tech Tonics – TIMSCDR Research Journal is a compilation of scholarly research papers and articles written by students of MCA (Masters in Computer Applications) course of TIMSCDR. The contents of the research papers and articles of this edition pertain to the application of Information Technology in the domains of Agriculture and Nutrition.

The Journal showcases the research endeavors of Post Graduate level students and helps them understand IT industry problems analytically or practically. These efforts also inculcate amongst the students the ability to think and elaborate new ideas in the dynamic field of Information Technology.

The Journal represents research work in various specializations in Information Technology like Internet of Things (IoT), Drones, Digital Marketing, e-Commerce and Remote Sensing and its applications in Agriculture and Nutrition.

To ensure originality of the research work, the research papers and articles were thoroughly checked for plagiarism and then selected for publication. The students got an opportunity to understand the relevance of standard research work through this academic exercise.

The seventh edition of Tech Tonics, Research Journal is a modest effort to encourage the young, enthusiastic and resourceful minds of the students to do research using latest techniques, and innovate and pen down emerging ideas in the field of Information Technology and its diverse Applications.

Editor

Dr. Vinita Gaikwad

Director, TIMSCDR

RESEARCH PAPERS

Impact of E-Commerce on Society

Guided by Prof. Pankaj Mudholkar

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TIMSCDR

Alok Singh
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Preeti Singh
TIMSCDR

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Abstract - E-Commerce has become a very popular method of trading amongst businesses and organizations. Most companies today have an online presence at the very least to hold information about themselves, raising their company awareness if they aren't using it to trade.

Everyone wants online due to the time it saves when compared to going out to find the product physically, the cheaper prices and comfortable mode of delivery of items purchased. This paper discusses on positive as well as negative effects of E-Commerce on society. It is observed that E-Commerce industry has fast growth rate in India.

Keywords – E-Commerce; E-Commerce ecosystem; B2B; B2C

I. INTRODUCTION

E-Commerce is simply the buying and selling of various products and services over the internet. Anyone with access to the internet can engage with e-commerce trading. E-commerce has two types of trading and that is business-to-customer (B2C) and business-to-business (B2B).

A bricks and clicks organizations, both on the high street and online, tend to make customers feel more confident when buying online as the product can be returned in-store while giving the customer both options of where they want to purchase their product from, online or in-store.

Bricks - physical store

- Clicks - online trader
- Bricks & Clicks - physical & online store

Multiple social implications have been created due to the popularity that has come to online shopping over the years[1].

II. POSITIVE EFFECTS OF E-COMMERCE ON SOCIETY

A. Convenience

Shopping online can be a lot more convenient than heading out to a shopping centre to find what you want. Instead, you can simply sit at home with access to the internet and order away.

B. Disabled & Elderly

Those who suffer from disabilities, whether they are physical or mental, or old age can often struggle to go shopping in your regular shopping mall. This

can become more of a problem when living greater distances from town centre's. Online shopping allows these individuals to stay in the comfort of their own home when ordering the products and services they desire.

C. Time Saving

Ordering an item online through an e-commerce site takes a lot less time when compared to travelling to your nearest store.

D. Information Availability & Price Comparison

The internet is filled with information and with the use of search engines like Google almost anything can be found out rather quickly. When you involve online shopping with these abilities you can easily find the best price for the product you are searching for without having to travel from retailer to retailer. Google Shopping is an example of a product search engine that finds the best price at the selling stores.[3].

E. New Businesses

When starting off a new business it can be mega-expensive to get it all up and running if you are planning on being a brick organization. The start-up and running costs for having your business start with an online presence is much cheaper than getting a shop and a place for product storage.

F. Jobs

In order to have an online presence and trade online you will need a website that is capable of selling your products or services with acceptable methods of payment. Smaller businesses are likely to hire an external company that specializes in setting up this kind of thing but larger companies on the other hand are likely to employ their own web developers, marketing analysts and search engine optimization specialists.

G. 24/7

Websites that run online are constantly available at all hours providing there are no technical difficulties. This is a great advantage for those who finish work late and don't have the time to run down to their nearest outlet to find the product they desire as they can now simply order online.

H. Greater Choice

When going out shopping you usually only have the availability of the products that are there. This differs when compared to shopping online. Firstly, it is highly likely that you can find the product you want to from multiple different sites. Also, when purchasing from a brick and clicks organization it is possible that the product you are after isn't available at your nearest store but instead it can be delivered from a store based elsewhere[4].

I. Global Marketplace

The internet spreads across the world and anyone with access to it can see what is up there. Therefore, if you have a website up and running anyone around the world can get access to your website. This gives you a global marketplace, but it also brings a much greater competition as you are competing with everyone else who has the same purpose as you with an online presence.

J. Pre-orders

Most high demanded products online today tend to have the option to be pre-ordered. This is a process that involves you paying for the product before it is released but in return having it delivered to your door on the release day. This is a very popular process with most entertainment products such as computer games.

K. New Marketing Models

Due to how online shopping has taken off in the recent years additional features have been developed alongside them. These include things like review forums where users can read up on what other people thought about a particular product. Advertising has also become a big part online as popular websites tend to display advert banners or sometimes the annoying pop-ups in order to attract in customers. PPC adverts have become a popular way of advertising and this works on a pay-per-click basis where the company hosting the advert will receive payment by the amount of clicks on that ad. Mail shots and customer loyalty schemes have also moved along with the introduction of e-commerce websites.

L. Advertising Online

The internet today is a very popular place, and this makes it ideal for advertising. Businesses who run their own e-commerce site often advertise for other non-competitors while generating additional revenue and building a partnership with that business which could do both companies a great of good.

III. NEGATIVE EFFECTS OF E-COMMERCE ON SOCIETY

A. Unemployment

Some organizations or businesses move from being a brick organization, where they are based in a

store, and move to become an online, more globally available company and therefore have no need for the staff they have employed in their stores.

B. Uncertainty

As there are some websites out there with the purpose to scam some people are afraid of entering their credentials online and they can't be blamed. There are trusted sites out there and there are multiple ways to detect whether they are official sites or not. PayPal is an online payment method that people can use that keeps your credential information private from the trader. The online trade will then work with PayPal meaning that none of your payment details are shared with the company you a buying from.

C. Security Issues & Customer Trust

It is important to provide a safe and secure online shop for a customer when their trying to buy products from you. This helps create a greater customer trust and ensure them that they can place an order without any worries to help encourage additional business with that customer in the future. The business will need to make sure that a safe gateway is available and that the information is secured when the customer makes the payment.

D. Returns & Complaints

If there is a product malfunction then the customer is going to want a replacement or refund giving that it was not their fault, if it arrived damaged for example. With a business that is solely based online it can be a lot of hassle for the customer to sort out a return or a refund as they can't simply walk into their nearest corresponding store. This can also create a bad experience for the customer and it is likely they will not be coming back to your shop again.

E. Direct Communication & Product Experience

When you order a product online the customer will have no face-to-face contact with the salesperson and no hands-on experience with the product. Instead, the product will usually have a few images to get an idea of the product along with a product description. Sometimes these images and descriptions can be misleading, and the customer could end up ordering an item that is not exactly what they want?

F. Delivery

When you order a product or service online you have to wait for the product to arrive. Usually these e-commerce sites offer different options for delivery which will range from faster delivery times at a higher price to slower delivery times at a lower price or in some cases free. But sometimes the product can take a good duration to come due to many issues and this can cause problems if the product or service you ordered is for an event that is coming up, like a birthday or Christmas present.

IV. E-COMMERCE ECOSYSTEM

- Online travel, ticketing
Ticketing for Air, Rail, Bus, Movies, and Events.
- Online Retail
Retail products sold through online route
- Online Marketplace
Platform where sellers and buyers transact online
- Online Deals
Online Deals purchased online, redemption may or may not happen online
- Online Portals classified
Includes car, job, property and matrimonial portals [2]

V. E-COMMERCE IN INDIA

Since the E-Commerce industry is fast rising, changes can be seen over a year. The sector in India has grown by 34% (CAGR) since 2009 to touch 16.4 billion USD in 2014. The sector is expected to be in the range of 22 billion USD in 2015. This is shown in following Fig 1. [3]

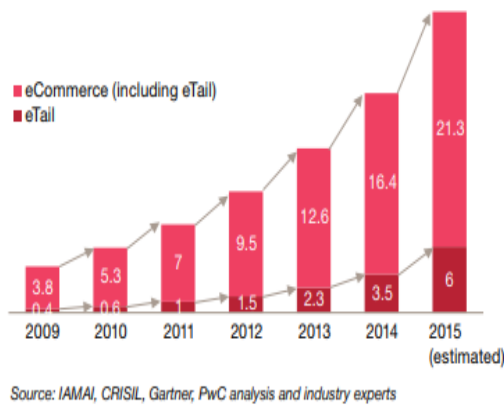


Fig 1: E-Commerce industry growth

Retail e-commerce sales in India from 2016 to 2022 (in million U.S. dollars) is shown in Fig 2.

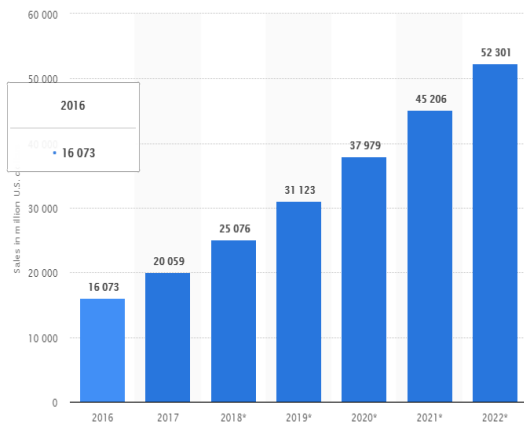


Fig 2: E-Commerce sales in India

VI. CONCLUSION

From all the above observation, it has come to conclusion that e-commerce has undeniably become an important part of our society. The E-Commerce is and will have a large part in our daily lives. Shopping online is more convenient than heading out to a physical market to find what we want. Instead, we can simply sit at home with access to the internet and order anything from anywhere.

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Hydroponic Farming

Guided by Prof. Sreeja S. S.

Aishwarya Mungekar
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Krunal Mistry
TIMSCDR

Abstract- A novel form of hydroponic culture was employed to explore the physiological function of roots of a tea plant (*Camellia sinensis*). The pH of the nutrient solution with an actively growing tea plant decreased during cultivation. Further-more, no oxalic acid, tartaric acid, malic acid or citric acid, all possible factors in acidification, was detected in the nutrient solution of a growing plant. A proton pump inhibitor suppressed the acidification of the solution. Soil acidification might have been accelerated with a proton released from ammoniacal nitrogen preferentially for the growth, suggesting the specific mechanism of tea plant as a functional food.

Keywords - Hydroponic; Wick systems; N.F.T systems

I. INTRODUCTION

Hydroponic farming is the modern technology of farming in which plant growth and productivity is controlled by water and its nutrients level in the water. In other words it's the farming without soil and growing crops on water.

A. Hydroponics Farming Process

In hydroponics farming water is enriched with well-balanced nutrients which are essential for plants growth and better yield water level pH will be maintained within the specific range which results in better growth. Plants take the nutrients from water and sunlight the following are the basic functions of soil which have to be provided in water-based farming in the absence of soil. [1], [4]. The process is shown in Fig 1.

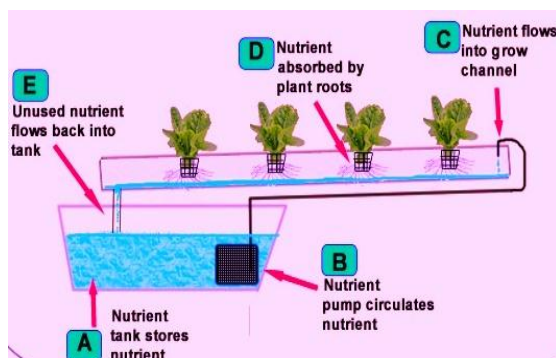


Fig 1: Hydroponics Farming Process

B. Advantages and benefits of Hydroponics Farming

1. Hydroponics uses all the mineral nutrients provided in water without any wastage
2. Hydroponics farming requires less water compared to soil based farming
3. The product quality will be high in hydroponics farming
4. This technology can be combined with greenhouse Technology to get better results.

C. Types of Hydroponic systems

When you think of hydroponics, you instantly imagine plants grown with their roots suspended directly into water with no growing medium. However this is just one type of hydroponic gardening known as N.F.T. (nutrient film technique). There are several variations of N.F.T. used around the world and it is a very popular method of growing hydroponically. What most people don't realize is that there are countless methods and variations of hydroponic gardening [2], [3]. This is shown in Fig 2.

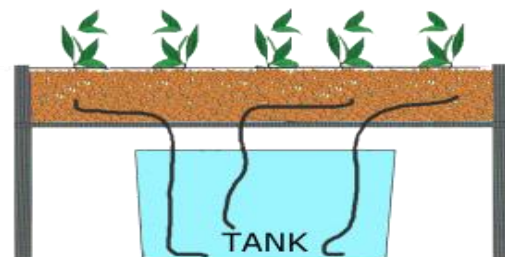


Fig 2: Hydroponics

D. Wicks System

Seen as the most simplistic hydroponic system. The Wick system is described as a passive system, by which we mean there are no moving parts. From the bottom reservoir, your specific Growth Technology nutrient solution is drawn up through a number of wicks into the growing medium. This system can use a variety of mediums, perlite, soil or coco. This is shown in Fig 3.

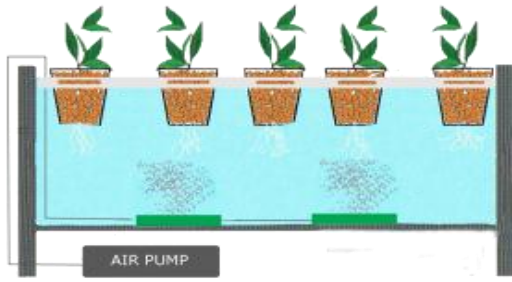


Fig 3: Wicks System

E. Water Culture

This system is an active system with moving parts. As active hydroponic systems go, water culture is the simplest. The roots of the plant are totally immersed in the water which contains the specific Growth Technology nutrient solutions. An air pump with help oxygenate the water and allow the roots to breathe. Very few plants other than lettuce will do well in this type of system. This is shown in Fig 4.

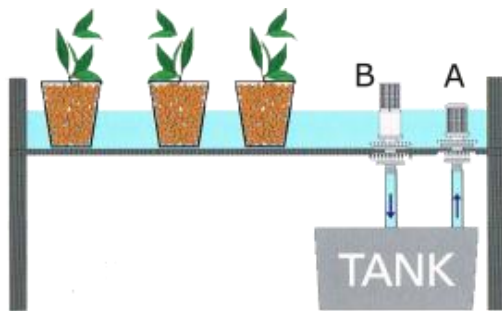


Fig 4: Water Culture

F. Ebb and Flow System (Flood and Drain)

This hydroponic system works by temporarily flooding the grow tray. The nutrient solution from a reservoir surrounds the roots before draining back. This action is usually automated with a water pump on a timer. Drip System (recovery or non-recovery) is shown in Fig 5.

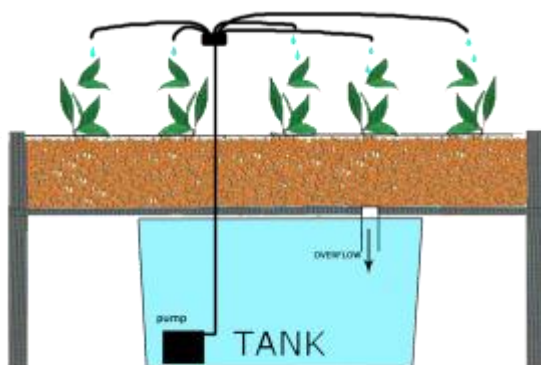


Fig 5: Drip System

Dip systems are a widely used hydroponic method. A timer will control a water pump, which pumps water and the Growth Technology nutrient solutions through a network of elevated water jets. A recovery system will collect excess nutrient solution back into the reservoir. A non-recovery drip system will avoid this allowing the pH of the reservoir not to vary. If using a recovery system, be sure to check the pH level of the reservoir regularly and adjust using either pH UP or pH Down solutions on a more frequent basis.

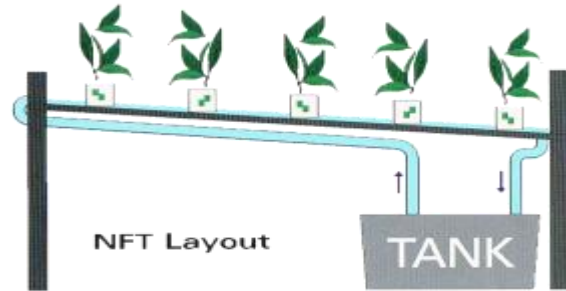


Fig 6: pH level

G. N.F.T System

The N.F.T system is at the forefront of people's minds when hydroponics is mentioned. Nutrient Film Technique uses a constant flow of your Growth Technology nutrient solution (therefore no timer is required). The solution is pumped from a reservoir into the growing tray. The growing tray requires no growing medium. The roots draw up the nutrients from the flowing solution. The downward flow pours back into the reservoir to be recycled again. Pump and electric maintenance is essential to avoid system failures, where roots can dry out rapidly when the flow stops. This is shown in Fig 7.

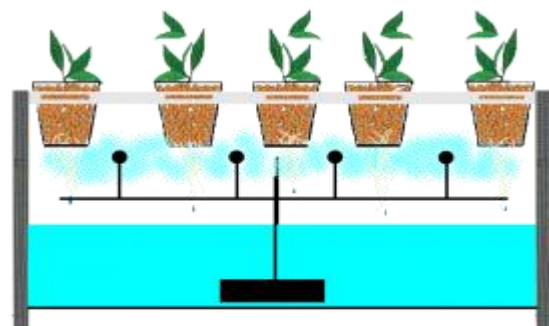


Fig 7: Nutrient Film Technique

H. Aeroponic System

Aeroponic systems are seen to be a high tech method of hydroponic growing. Like the N.F.T system the growing medium is primarily air. The roots hang in the air and are misted with nutrient

solution. The misting of roots is usually done every few minutes. The roots will dry out rapidly if the misting cycles are interrupted.

A timer controls the nutrient pump much like other types of hydroponic systems, except the aeroponic system needs a short cycle timer that runs the pump for a few seconds every couple of minutes.

II. TOP SMARTPHONE APPS FOR HYDROPONIC GARDENING

A. *By pH Hydro / Technology*

Hydroponic gardening can be an activity that requires a fair amount of skill. For growers who are devoted to their hobby, you may understand how hydroponic gardening is actually more of a science than just a pastime. To produce the best results you need to constantly monitor you're the growing conditions of your indoor environment. This includes factors such as lighting, nutrient solution, and pH levels as well as peripheral conditions like room temperature, ventilation and humidity. And that's not to mention all the potential diseases, pests, and other types of symptoms you want to watch for. It makes managing and growing a successful garden quite tricky, especially if you've got more than one system operating at any given time [5], [6].

We live in a connected world where access to information is always an option to help us solve our challenges – even when it comes to hydroponic gardening.

B. *Top Smartphone Apps for Hydroponic Gardening*

There are a variety of apps designed to help monitor, maintain, and protect hydroponic gardens while relieving many of the common headaches that occur for growers. Here are some apps for hydroponic gardening that are getting a lot of buzz:

C. *Apps for Selecting Plants*

Pocket Garden: A research tool for selecting the best plants for your garden. Includes tips on germinating seeds and harvesting of certain crops.

When to Plant: A database of thousands of plant types including their ideal planting dates and care requirements.

MQ Green Thumb: An app for consulting your gardening project from start to finish. This app helps you select the best location for your plants based on sun exposure as well as it contains a database of plant information which can be saved to a clipboard. Garden Compass smartphone app is a plant and disease identifier. Image via GardenCompass.com

D. *Apps for Monitoring Growth*

Perfect Hydroponics: A documentation tool to record your garden's progress. Use the notes to

compare your results to future gardens to improve the health of your plants.

GroLog by Grodan: A multi-garden assistant that helps you record the progress of each garden by selecting what kind of data you'd like to track (i.e. nutrients, lighting, room conditions). This app also has a scheduling and reminders feature that will alert you as to your garden's needs.

HID Gardener: A documentation app that allows you to record your indoor garden's productivity based on your specified data sets. Notes can also be recorded throughout the growth cycles.

E. *Apps for Treating Plants*

Plant Doctor: A plant health improvement app that helps you identify plant stress treatment options based on the symptoms. Solutions such as lighting, watering, and nutrient levels will be presented.

Garden Compass: An identifier app that allows you to submit photos of your plant to a group of experts. These garden advisors will identify for you the pest or disease type as well as their treatment recommendations.

III. PROS AND CONS

Hydroponic farming is complicated, but for many farmers, the benefits outweigh the downsides [6]. The pros and cons is discussed in following Table 1.

TABLE 1: Pros and Cons

Pros	Cons
Increased productivity Using nutrient solutions, artificial lights, heaters and other pieces of equipment, plants can be made to develop faster, produce larger yields and grow all year round.	High set-up costs Setting up a hydroponic farm requires a large amount of equipment, all of which needs to be purchased before the farm launches.
More eco-friendly Water in a hydroponic system can be recycled – at its most efficient a hydroponic farm only uses 10% of the water a normal farm uses. Because it's a closed system, nutrients don't leach away – an efficient hydroponic farm may only use 25% of the fertiliser a regular farm uses. Plus, eutrophication (dense growth of aquatic plants like	Higher running costs Many of the control systems – pumps, water purifiers, lights, heaters, etc – need to be powered, which costs money. In conventional farming, heat, light and (some) water is provided naturally for free.

Pros	Cons
algae caused by run-off of fertiliser) isn't a problem. Soil pests are non-existent, and in enclosed greenhouses natural predators can be used to control insect pests – next to no pesticide is required.	
Feasibility in areas not suited to traditional farming Its high water efficiency makes hydroponic farming possible in arid environments. Hydroponic growing trays can be stacked on top of one another, and plants can be placed closer side by side than they can in soil, making it vastly more space-efficient than traditional farming. Because nearly all environmental conditions can be controlled artificially, unconventional growing spaces can be used – uninhabited buildings, disused railway tunnels, etc.	Vulnerability Because they are mechanised, hydroponic systems are vulnerable to power failures. In systems where roots are highly exposed, unwatered plants can dry out rapidly. Nutrient and pH imbalances can build up far quicker in a solution than in soil; if something goes wrong, an entire crop can be wiped out very quickly. Likewise, water-borne diseases can spread quickly and widely, and water-borne microorganisms can contaminate solutions fairly easily.
Reduced transportation Crops can be grown away from their natural habitats and closer to consumers, reducing transport emissions and providing people with fresher goods.	Need for monitoring Although a hydroponic farm requires less effort overall (planting and harvesting is far less labour-intensive), hydroponic plants cannot be left to their own devices for long periods like regular fields of crops. A hydroponic farm must be regularly attended to by a farmer, or else automated.
Monoculture not a problem Farmers don't need to worry about exhausting their fields of certain nutrients through growing the same crop over and over – there is no need for crop rotation, so in-demand crops can be focused on.	Need for expertise Hydroponic farmers need to understand the technique, which is complicated.

IV. CONCLUSION

Using hydroponics systems, mineral nutrients are dissolved in water and feed directly to a plant's root system allowing the plants to focus their energy into growing mostly upward, promoting quicker growth, faster harvests and higher yields. Hydroponics systems are used year-round both indoors and outdoors for growing herbs, foliage and food items. Hydroponics setup do not use soil but instead, use an inert growing medium to anchor a plant's roots

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Sensor based Irrigation

Guided by Prof. Brijesh Pandey

Meet Shah
TIMSCDR

Omnarayan Shukla
TIMSCDR

Abstract - One of the most common problems with farm irrigation systems is the scheduling. Irrigation scheduling is simply answering the questions of “When do I water?” and “How long do I water?”. Starting an irrigation cycle too early and/or running an irrigation cycle too long is considered over watering. At the very least this practice wastes water and money. However, overwatering can cause crop damage if done on a prolonged basis. Likewise, starting an irrigation cycle too late or not running the system for a long enough period of time is considered under watering and can cause reduced yields and poor crop quality which can affect price. Looking at these problems in depth is the key to minimizing their financial and practical impact on crops.

Keywords–Evapotranspiration; Soil Moisture; IoT

I. EXISTING SYSTEM

The most common methods for dealing with these problems are Evapotranspiration based control systems and soil moisture-based control systems. Evapotranspiration (ET) is the combined process through which soil moisture is lost directly to the atmosphere through evaporation and plants taking water out of the soil and transpiring it to the atmosphere. ET is typically a calculated value that takes into account factors such as recent rainfall, relative humidity, solar radiation, and a crop coefficient that accounts for the plant size and stage of growth. The calculated ET will give the grower an estimate as to how much water the soil is losing due to ET. Once he knows how much soil moisture he is losing he can determine how long he needs to irrigation to replace the lost soil moisture.

Soil moisture-based control systems use soil moisture sensors to measure the actual soil moisture. This method is typically more accurate the ET calculations because it is actually measuring the moisture level in the soil instead of calculating what should be there. Soil moisture control systems tell the farmer when to begin an irrigation cycle and also tell him when the soil moisture level reaches field capacity.

Occasionally ET based control systems are used with some type of soil moisture sensor such as a tensiometer to provide some feedback as to the accuracy of the ET calculations. ET or soil

moisture-based controls provide a much more consistent and reliable method of controlling irrigation system.

II. PROPOSED SYSTEM

Proposed method can help to reduce the load on the farmers. That means farmers don't have to visit the farm at regular interval of time period to control both the overwatering or underwatering factors. This will be done using the Internet of Things (IoT) where sensors detect both the factors like underwatering and overwatering.

That means there are sensors which constantly checks the moisture level the fields. Following Fig 1 shows how the sensors can be deployed in the barren land.



Fig 1: Barren land

The system sends alert to the farmer that it's time to do irrigation process. Farmer get options like proceed or deny. Depend on the crops nature farmer decide to proceed or not. On the basis on options if farmer goes for proceed one IoT start irrigation and sensor constantly check the water level and when it reaches certain defined level it will automatically turn off the irrigation sprinkler that results in green yield which is shown in Fig 2.



Fig 2: Irrigated Field

III. TECHNOLOGY USED

Following technology components are used in implementing sensor-based irrigation.

A. Raspberry Pi Model B SBC

The Raspberry Pi 3 Model or Pi 2 B model are used. The new Pi 3 brings more processing power and onboard connectivity, saving time with the development of your applications and perfect for your IoT designs. The Fig 3 shows Raspberry Pi Model B SBC.



Fig 3: Raspberry Pi Model B SBC

- Comparison of Pi 3 and Pi 2
Pi 3 has more processor speeds. The CPU on the Pi 3 is one and a half times faster at 1.2 GHz. Your Pi board performs better.
- Features of Pi 3
On-board connectivity. The Pi 3 features 802.11 b/g/n 2.4 GHz Wireless LAN and Bluetooth Classic & Low Energy (BLE). You can get connected much quicker without the need for any external device.
- 2.5 A power supply. With more processor speed and onboard connectivity, you'll need more power. Power supplies for previous Pi boards will not be sufficient. You will need the Official Raspberry Pi 3 Power Supply (9098126 — white) or (9098135 — black).

New components:

The Pi 3 features a chip antenna where status LEDs were located previously. The status LEDs are still on the board, right next to the microSD card slot.



Fig 4: Irrigation Pump

- Irrigation Pump
Energy efficient than the normal electric induction motor pumps, more than 50% energy saving during working hours.
Inverter technology to ensure smooth rate of flow and maintain the resistance of motor under different conditions, suitable for freshwater and saltwater. Pump has shaft made of high strength wear-resistant material, long life, ultra-quiet, simple cleaning and tool-free disassembly and must be used in the water. It must cut off the electricity once the product works improperly and must maintain it after lifting it from the water.
Technical Parameters are given as below:
Model: JTP-4800
Voltage: 220 V/50 Hz
Power: 32 W
H-Max: 4.5 m
Output: 4800 liters/hour

B. Android App Development



Fig 5: Android App

Android is an open source and Linux-based operating system for mobile devices such as smartphones and tablet computers. Advanced mobile Android App are used as part of IoT for communicating with farmers for controlling irrigation related issues.

C. Sprinkler



Fig 6. Sprinkler

Setting of Sprinkler for Grass watering:

- 3 times a day
- 4 minutes each watering cycle
- 1 hour in between each watering cycle

For the crops sensor detects the soil moisture condition and send application information according to the soil conditions.

IV. CONCLUSION

By this system we have reduced the efforts of the farmers for growing crops within minimum water. Due to constant checking of the water level it is possible to reduce the over-watering and improve the soil quality. This method controls the Soil erosion.

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Impact of Information Technology in Agriculture Sector

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Abstract -There are many ways in which Information Technology can be used to exchange the information rather effective communication like information kiosks which provide not only the basic services like email, helps in education, health services, Agriculture and Irrigation, online trading, community services etc., expert systems which helps in determining marketing alternatives and optimal strategies for producers, integrated crop management systems for different crops, Farm-level Intelligent Decision Support system developed to assist in determining optimal machinery management practices for farm-level system. Information technology helps to predicts the results related to the agriculture specially plant physiology. Leaf protein study is an important study which helps to solve protein deficiency and malnutrition. Present study deals with role of IT in Agriculture. The application of mKRISHI is considered for case study.

Keywords – Information Technology; Precision Agriculture; mKRISHI

I. INTRODUCTION

Agriculture is one of the most important sectors in India and could benefit tremendously with the applications of ICTs especially in bringing changes to socio-economic conditions of poor in backward areas. Agriculture constitutes a major livelihoods sector and most of the rural poor depend on rain-fed agriculture and fragile forests for their livelihoods. Farmers in rural areas have to deal with failed crops and animal illness frequently and due to limited communication facilities, solutions to their problems remain out of reach (World Bank, 2009). The service role of ICTs can enhance rural communities' opportunities by improving their access to market information and lower transaction costs for poor farmers and traders. Though India has a strong and fast-growing IT industry, access to ICTs remains very low. Particularly in rural areas. The present indicators of IT penetration in Indian society are far from satisfactory[1], [2].

The National Policy for Farmers emphasizes the use of Information and Communication Technology (ICT) at village level for reaching out to the farmers with the correct advisories and requisite information. With this background information, the paper is devoted to outline the level of attitudes of the farmers on ICT application in agriculture, impact of ICT application in agriculture activities and problems in accessing the ICT application.

Information Technology is the buzz technology now-a-days. It is the technology that is helping to exchange the information in fast and easier way. Due to this technology the distance between or the difference between the nations is reduced and now world is becoming a global village This technology provides an opportunity to the developing nations and under developed nations so that can build up their strategies and compete with the developed nations.

In any sector information is the key for its development. Agriculture is not exception to it. If the relevant and right information in right time is provided it can help agriculture a lot. It helps to take timely action, prepare strategies for next season or year, speculate the market changes, and avoid unfavorable circumstances. So the development of agriculture may depend on how fast and relevant information is provided to the end users. There are other traditional methods to provide the information to the end users. Mostly they are inoculated, untimed and also communication is one way only. It will take long time provide the information and get feedback from the end users.

Precision Agriculture is precise in both the size of the crop field area and delivery amounts of water, fertilizer, pesticides etc. This technology can isolate a single plant for monitoring in the tens or hundreds of square feet. Precision Agriculture requires a unique software model for each geographical area, the intrinsic soil type and the crop or plants. For example, each location will receive its own optimum amount of water, fertilizer and pesticide. It's generally recommended that data collection be done on an hourly basis. Frequent data collection doesn't provide additional useful information for the software model and becomes a burden to the WSN in terms of power consumption and data transmission. Less frequent monitoring may be acceptable for certain slow growth crops and areas that have very stable, uniform climate conditions. The data collection, monitoring and materials application to the crops allows for higher yields and lower cost, with less impact to the environment. Each area receives only what is required for its space, and at the appropriate time and duration. A general Agricultural application can be employed for: Large crop area monitoring, Forest/Vegetation monitoring, Forest fire prevention, Biomass studies,

Tracking Animals, Crop Yield Improvement [2], [4].

II. APPLICATION OF IT IN AGRICULTURE

A. Environmental Monitoring

Describes the processes and activities that need to take place to characterize and monitor the quality of the environment. The foundation of EM is the collection of data, which enables a better understanding of our natural surroundings to be gained by means of observation. Environmental Monitoring is not limited to the understanding of environments, but also includes monitoring for preservation reasons. The environmental parameters, such as temperature, humidity, water seepage of ground, etc. are the key factors of substations in electric networks. The manual inspection is still used in many substations in India [3].

B. Water Management

The application of wireless sensor network for a water irrigation control monitoring is composed of many sensor nodes with a networking capability that can be deployed for an ad hoc and continuous monitoring purpose. The parameters involved in the water reservation control such as the water level and motor movement of the gate controlling the flow of water will be measured in the real time by the sensors that send the data to the base station or control/ monitoring room. Precision irrigation is an important practice in water- saving agriculture cropping system, which allows producers to maximize their productivity while saving water. While the accurate irrigation amount is difficult to obtain as the impact factor was too much.

C. Pest Control

Pest detection and control is at least as old as agriculture because there has always been a need to keep crops free from pests. Many techniques so far proposed for pest control in agriculture using wireless sensor network. Since agriculture is considered as one of the oldest occupational activity, pest management and control is then born. Farmers usually need to keep their crops free from harmful pests as possible for these creatures may damage their yields resulting to a poor harvest and poor food quality. So far, there are many feasible techniques proposed for pest control in agriculture using WSN.

III. CASE STUDY: mKRISHI

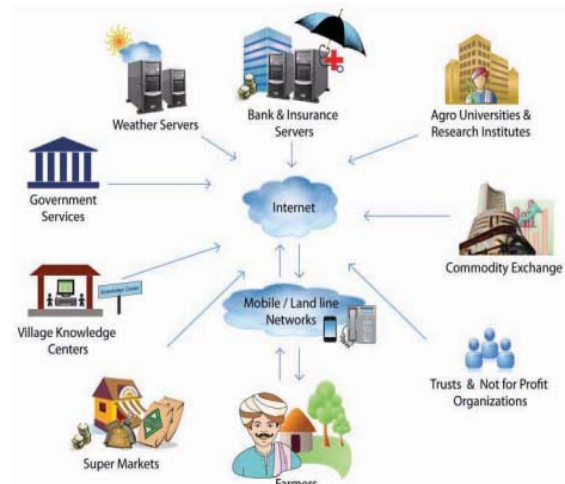


Fig 1: mKRISHI

The mKRISHI platform, developed by Tata Consultancy Services in 2007, enables farmers to access best-practice information and agricultural experts through low-cost mobile phones using SMS. The connection between agricultural advisory services and risk mitigation is an important one, because information alone is often not sufficient to manage risk. Through the advisory service, farmers might inquire how much fertilizer or pesticide to use, so they can optimize their use of these costly inputs. Similarly, farmers might inquire about when to harvest to avoid inclement weather. Farmers with cameras in their phones can submit photographs to supplement their messages. While responding to farmers' queries, experts can incorporate soil information by accessing the soil sensor nearest to the caller's location. Farmers can also request a voice- or SMS-based expert response. mKRISHI disseminates a wide range of personalized information; the critical difference is that experts can respond to farmers' queries. To provide the early warning and news information, the system relies on a web-based mobile platform that ties into many information sources. Data are gathered from commodity exchanges, agricultural research Institutions or Agricultural University, banks, weather servers, local markets, and solar-powered weather and soil sensors distributed throughout the areas where the service is offered. To respond to farmers' queries, mKRISHI relies on an automated database of frequently asked questions. The database can handle most questions, which are usually generic, but more specific or sophisticated questions are forwarded to 10 experts with Internet access. These experts interact with a system that resembles email; they can see attached photos and soil sensor information with each message and their

response is sent back to the farmer by SMS. This is shown in Fig 1. The complexity of the platform and the numerous pieces that are tied together, from people to technologies to automatic sensors, imply a difficult and expensive challenge to sustainability. Another challenge is posed by the inability to collect the full marginal cost of the service from farmers[3],[5].

IV. CONCLUSION

The Indian farmer and those who are working for their welfare need to be e-powered to face the emerging scenario of complete or partial deregulation and reduction in government protection, opening up of agricultural markets, fluctuations in agricultural environment and to exploit possible opportunities for exports. The quality of rural life can also be improved by quality information inputs which provide better decision-making abilities. IT can play a major role in facilitating the process of transformation of rural India to meet these challenges and to remove the fast-growing digital divides crops.

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A Pervasive Study on Suicidal Nature of Farmers, Concerning the State of Maharashtra

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Abstract- Agriculture has always been the backbone of Indian economy. But in the recent years there has been a considerable drop in the farmer's population. One of the most important factor to contribute to farmer's suicide is no transparency in agricultural marketing. Thus, by automating the activities involved in agricultural marketing (sending, exchange, forwarding, etc.), we thrive to give farmers a sense of security about their productions as well as the profit they deserve.

Keywords- Agriculture Marketing, Farmers, Problems of Farmers, Middlemen & Farm Products, Automating, Radio-frequency identification (RFID), android phones.

Keywords – RFID; Branding; Price Fluctuations; Lack of Finance

I. INTRODUCTION

India is an agricultural country and primarily depends on agricultural economy. Agriculture is one of the most major factor which contributes about 17% to the total GDP and also provides employment over 60% of the population. Earlier Indian agriculture was subsistence farming but development of means of transport and storage facilities, today agriculture has become commercial in character where farmers grew crops which fetch them better prices. Thus, the cropping pattern is no longer dictated by what a farmer needs for his own personal consumption but what is responsive to the market in terms of prices received by him [1],[3],[4].

But being an agricultural oriented country today still its agricultural marketing has been defective which has led to gradual decline in farmers population. The statistics of famers suicide rate in Maharashtra in 2015 was nearly 3,030 i.e. about 37.8% overall India which was the highest suicide rate. The farmers of India are unable to get reasonable price for the products even after their hard work and they are fully exploited by the middleman. Due limited resources, farmers depend on borrowed money to purchase seeds and other inputs and to farm their land. A drop in their farm income could quickly lead to farmers owing more than they own. There are various reasons for this loop hole in agricultural marketing, one of the factor is too many intermediates i.e. middleman who exploit the farmers by buying the goods at lower prices and exploit the customers by demanding high prices from them. [2]

The illiteracy of farmers and defects in weights and scales of famers lead them to their exploitation. To vanquish this problem, we can make use of IT by making use of RFID (Radio-frequency identification) sticker tags and android to integrate it into the supply chain of products/goods produced by farmers thus, maintaining the transparency within them. This would eliminate the need for middlemen in between which would automatically lead to justified price for farmers. This would need awareness to the farmers about the knowledge and usage of android [5],[7].

II. AIMS AND OBJECTIVE

- Understand the problems currently present in the marketing structure.
- To find the root cause behind it
- Try and give a better and feasible solution to overcome that problem.

III. LITERATURE REVIEW

A considerable amount of research has been done on the working and performance of agricultural marketing in India, by the academicians and researchers. The literature obtained by the investigator, in the form of reports and research studies, is briefly reviewed in this part.

A. Reardon and Barret (2000)

In their study suggest that when market reforms the commodity, prices raise, stimulating an increase in production, especially of the export crops. The rise in price facilitates the establishment of super market chains, cooperatives, export-oriented schemes, processing zones and general stimulation of agro industrialization in developing countries. [6],[8].

B. Kashyap and Raut (2006)

In their paper suggested that, marketers need to design creative solutions like e-marketing to overcome challenges typical of the rural environment such as physical distribution, channel management promotion and communication. The “anytime-anywhere” advantage of e-marketing leads to efficient price discovery, offers economy of transaction for trading and more transparent and competitive setting. [6]

C. *Johnston and Mellor (1961)*

In their paper stated that commercial demand for agricultural produce increases due to income and population growth, urbanization, and trade liberalization. Marketed supply simultaneously rises due to productivity improvements in production, post-harvest processing, and distribution systems. [7] The above research states that agriculture can create great economic profits if the supply and sale is handled properly. It also states that market prices change rapidly in a year and it is necessary to keep a track of them for increasing the profits of farmers.

IV. PROBLEMS IN THE EXISTING SUPPLY CHAIN SYSTEM

Although, there are many problems in the agricultural system, we will be focusing on the ones surrounding the agricultural market or the supply chain system. These are some of the few points that we have taken from the paper, International Journal of Multidisciplinary Research and Modern Education (IJMRME) in the paper 'Problems in the Marketing of Agricultural Goods' by Dr. G. Karthikeyan. The problems the farmer's mostly face is:

A. *Lack of Finance*

Finance is the biggest concern of the farmers to fulfil financial need varies from year to year depending upon the quantity of production. Most of the financial needs of the farmers are met by moneylenders in India. A farmer in India is born in debt lives in debt and finally dies in debt

B. *Large Number of Middlemen*

Distance between villages and cities is extremely vast in India. A long channel of distribution is required and hence there are large numbers of middlemen. The long chain of middlemen takes a large amount of the farmer's share from the consumers' rupee. The middlemen sell the agricultural goods to the consumers at a higher price and give lower returns to the farmers.

C. *Transportation and Storage Facilities*

There is high demand for transportation and storage facilities in the harvest seasons, in order to protect the produce from degrading in quality. Production of agricultural products is seasonal. The consumption rate is regular, and the demand is regular throughout the year. So, special transportation and storage facilities are in necessity.

D. *Grading and Standardization*

Grading and standardization is very important for agricultural products. But it is not easy to grade and standardize the products, as there are lots of

agricultural goods that one produces, and it has many qualities.

E. *Branding*

Agricultural products do not create demand as they are needed throughout the year. Advertising is not possible due to the limited resources of farmers. As there are many qualities involved, branding is also not an easy job.

F. *Price Fluctuation*

There is price fluctuation in agricultural products as there is imbalance in supply and demand. The advantage of this is taken by the middlemen as due to lack of knowledge most of the time the farmers are even unaware of these fluctuations.

G. *Lack of Market Information*

As stated above, in India most of the farmers are illiterate and ignorant of the accurate prices ruling in the markets. Hence, they depend upon inaccurate information. They depend on hearsay reports of village merchants or the middlemen who never reveal correct price. [8]

V. SUGGESTION

We have an agricultural country. It is very important to eliminate as many problems in the agricultural sector as possible. As the use of RFID sticker tags and android is increasing day by day why not introduce them in the supply chain. [9]

- Our suggestion is that when the goods are first packed by the farmers, they may be tagged with RFID.
- This RFID sticker tag be then able to identify the product uniquely on an android app.
- Once the RFID is set the price of the product would not be allowed to change.
- So, the middlemen must provide accurate price from the beginning per the current demand.
- Whenever the product will go through a middleman he must scan through the RFID via his phone application and this entry will be fed into the server and the farmer will know which merchant his product is passing by right at that moment.
- At the time of delivery, the product would be marked as sold and the price would be same as before
- Now you may say that he could just rip off the RFID tag, well yes, that is a possibility, but you need to remember product is registered in the android app therefore if the product is not updated for the delivery then it will be considered as foul play and we can find out which two middlemen the product was between. This system is shown in Fig 1.

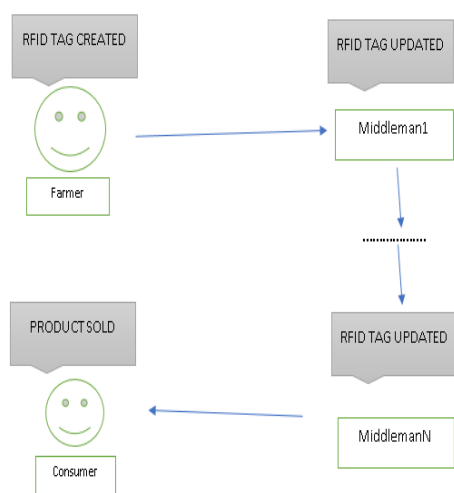


Fig 1: Suggested System

As the price is set as per the current market the farmers will get their designated profit. Also, as every step is recorded in the app the farmer's will have full transparency of the supply chain. This may eradicate the problems such as middlemen, price fluctuation and lack of market information.

I. CONCLUSION

We are sure that this endeavour with time can be a good success as there is enough scope and a big need for transparency in the agricultural marketing. Although, there will come many problems in the future to implement a system like this, but if implemented it can change the way agricultural marketing is today.

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Use of Drones in Agriculture

Guided by Prof. Brijesh Pandey

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Abstract—This paper represents application of Unmanned Aerial Vehicles (UAVs) also known as drones. Indian farmers face difficulties to grow the crops as they are poorly informed about farming and agriculture. It takes time to sprinkle water and pesticides manually. They also lack knowledge to use right amount of water and pesticides to be sprinkled. By using drones, the farmer's efforts will be reduced, and time consumed will be less as drones can sprinkle exact amount of pesticide and water. According to recent analysis world population will increase to 9bn so it is necessary for the farmers to make changes in the way they produce crops.

Keywords - Unmanned aerial vehicles;

I. INTRODUCTION

The UAV is an aerial vehicle which does not need a human operator aboard. They are remote controlled aircraft which can also fly autonomously based on pre-programmed flight plans. They can assist everyone in modern day work. [1]

II. OVERVIEW

Think a scenario, when a farmer does not have any labor and he has to sprinkle pesticide or water on an acre of land; It will take him one whole day to spray pesticide or water, with no guarantee that all the pesticides or water will be sprayed equally in every part of the field. Using UAVs the same area can be covered within 5-10 minutes and the exact amount of water/pesticide will be sprayed [3],[4].



Fig 1: Unmanned aerial vehicle

The farmer can pre-program the area by walking around the field with the controller; these routes are saved and can also be used later. It is easier for the farmers to maintain the distance between the crops and drone by using sensors, as drone can adjust the height according to the terrain, which won't damage the crops and accurately spray the pesticide/water. It can be dismantled easily for repair as agricultural drone requires regular maintenance.

Indexed map of the overall health of the plants can be obtained with the help of the drones. With the help of the obtained images from the drones the farmer will be able to understand which area of the field is infected or need more care. This is shown in Fig 2.

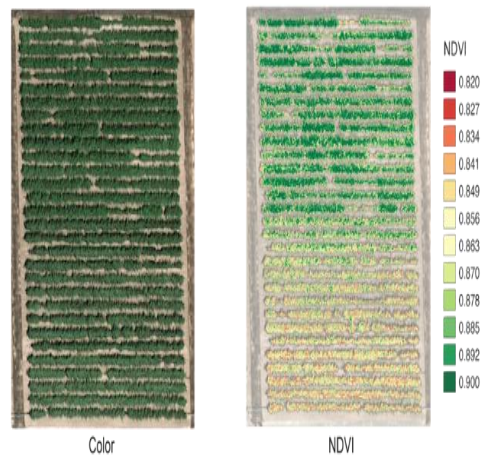
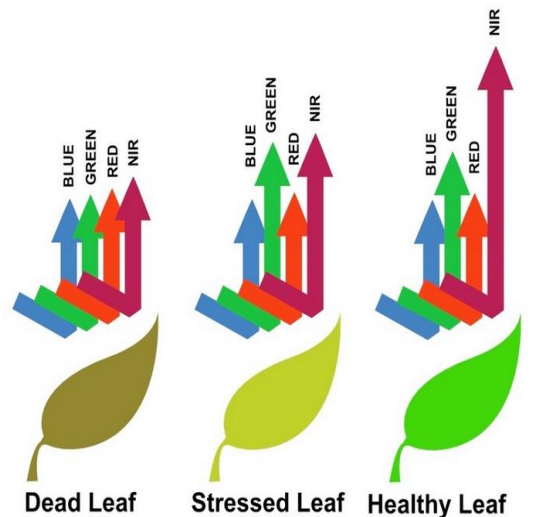


Fig 2: Field health map

Drone can provide farmers with 2 types of detailed views.

1. Getting an aerial view can reveal patterns that expose everything from irrigation problems to soil variations, even pests and fungal infestations that aren't apparent at positive

level. This is shown in Fig 3.



The basic principle of NDVI relies on the fact that, due to their spongy layers found on their backsides, leaves reflect a lot of light in the near infrared, in stark contrast with most non-plant objects. When the plant becomes dehydrated or stressed, the spongy layer collapses and the leaves reflect less NIR light, but the same amount in the visible range. Thus, mathematically combining these two signals can help differentiate plant from non-plant and healthy plant from sickly plant.

(Image courtesy Agribotix.com)

Fig 3: Observations

2. Aerial cameras can take multispectral images, capturing data from the infrared as well as the visual spectrum, which can be combined to create a view of the crop that highlights differences between healthy and distressed. By using drones, the quality and quantity of crops will increase due to the precise use of pesticides and water. A drone can survey a crop every week, every day, or even every hour.

The manual efforts will be reduced and time will also be saved.

III. ADVANTAGES

- Drones can be used for soil and field analysis. They can be used to produce accurate 3-D maps that can help conduct soil analysis on soil property, moisture content, and soil erosion.
- They can be used for planting purposes, and also for seeding by shooting the seeds and the required nutrients in the fields which in return provide better growth and cheap rate of plants/crops.
- It is very difficult to monitor the entire farm manually. Monitoring will be easy using drones, as the farmer personally doesn't have to go through the entire field to monitor.
- It is easy to spray water/pesticides on crops, in the right amount.
- Time consumption will be less. Health assessment of crops to check whether crop has bacterial or fungal infection can be done by using cameras.
- Determination of the biomass, crop growth and quality of food [2].

- Using near-infrared, you can identify stress in a plant 10 days before it becomes visible to the naked eye.

IV. DISADVANTAGES

- Cost: Initial cost of the Drone is expensive, but it will provide the farmer a great value of money.
- When the weather is bad, making use of Drones will be difficult, in short it is weather dependent.
- Imaging can vary depending on sunlight and cloud cover.
- Limited flight times.
- The need for skilled operators.
- In India, use of drones is illegal, but you can use it with legal permission [2].

V. CONCLUSION

This paper presents a deep study about UAVs and its working. Since many people do not know about its advantages, awareness about this must increase amongst the people. When used with prudence, a drone can be a potential tool to better control our agricultural productivity.

Further, advancements should be made in the use of drones, it should be made legal (for agricultural purposes) as soon as possible. This would help farmers and save their time and provide good quality crops.

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Artificial Intelligence and Image Analysis in Dairy Farming

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Abstract-Dairy farming has been one of the most important types of farming. There are many types of people depended on the dairy farming. To make dairy farming more better and get it in with the latest technologies we will be making use of artificial intelligence and image analysis to give the dairy farmer a helping hand. In the current time the use of artificial intelligence is just spreading to different domains where use of such technology was not thought of before. With the boon of artificial intelligence we will be also using image analysis which has one a long way for being very unpredictable to somewhat useful in today's time.

Keywords-Image Analysis; Artificial Intelligence; Deep Learning; Cattle; Problems of Dairy Farmers; Health monitoring

I. INTRODUCTION

Dairy farming is a class of agriculture for long-term production of milk, which is processed (either on the farm or at a dairy plant, either of which may be called a dairy) for eventual sale of a dairy product. While cattle were domesticated as early as 11,000 years ago as a food source and as beasts of burden, the earliest evidence of using domesticated cows for dairy production is the seventh millennium BC - the early Neolithic era - in north-western Anatolia . Dairy farming developed elsewhere in the world in subsequent centuries: the sixth millennium BC in Eastern Europe, the fifth millennium BC in Africa, and the fourth millennium BC in Britain and Northern Europe [1],[2].

In the last century or so larger farms specialising in dairy alone has emerged. Large scale dairy farming is only viable where either a large amount of milk is required for production of more durable dairy products such as cheese, butter, etc. or there is a substantial market of people with cash to buy milk, but no cows of their own. In the 1800's von Thünen argued that there was about a 100 mile radius surrounding a city where such fresh milk supply was economically viable [3],[5],[7].

When dairy farmers are busy with routines such as cleaning cow sheds, milking and feeding, it becomes difficult to determine the condition of cows. If this continues, they may be too busy to ensure the quantity and quality of milk and dairy products.

So we will be Robotics and artificial intelligence (AI) offer the potential for dramatic changes in the

milking systems of the future (Rossing, W., 1994, Maltz, E., 20(0). For this kind of systems, economic and regulatory benefits achieved by using rapid and accurate information are desirable [4],[6].

II. AIMS AND OBJECTIVES

- Understand the problems currently present in Dairy farming.
- To find the root cause behind it
- Try and give a better and feasible solution to overcome that problem.

III. DAIRY METHODS USING ARTIFICIAL INTELLIGENCE

The below methods will be combined to form a whole system

A. Image Analysis

To find lameness: Before going through this technique we must first understand what this lameness in cattle is? Lameness includes any abnormality which causes a cow to change the way that she walks, and can be caused by a range of foot and leg conditions, themselves caused by disease, management or environmental factors. This can include hock damage, bruising, sores and cuts in addition to hoof conditions caused by disease; some farmers may traditionally only have counted the latter when considering if a cow is lame or not. Controlling lameness is a crucial welfare issue and is increasingly an inclusion in welfare assurance schemes. Using image analysis, we will be finding if there is any lameness occurred in some cattle. A neural network will be used which will give us the result if there is lameness occurred in some cattle. This is shown in Fig 1.

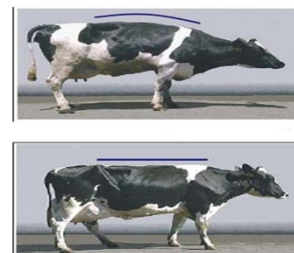


Fig 1: Lameness in cattle

A traditional farmer will notice the lameness quite in the later stages because the farmer is busy the whole time doing different chore if the cattle [2],[6],[8].

To Find HooveLetions:Hoofletions is another cause of concern in dairy farming. There are two types of hooveletions, infections and non infectious. However the hooveletion detecting and treating is a must. To detect hooveletions we will be using infrared image analysis using neuralnetwork.The following two images consist of an untreated hoof letion and treated hoop [5],[10].

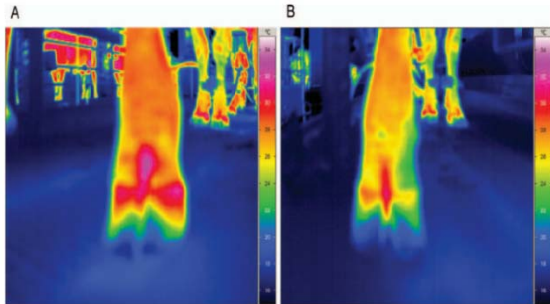


Fig 2: untreated hoof & treated hoopletion

B. Artificial Intelligence

Using the data from image analysis and constant monitoring the ai will provide the dairy farmer with better information about the health of the cattle and the ai will be doing all the work like monitoring the health and monitoring the feeding of the cattle, monitoring the milking process and monitoring the milk production of the cattle.The dairy farmer will be notified by the AI by either a mobile app or on a computer system. This is shown in Fig3 [8],[9].

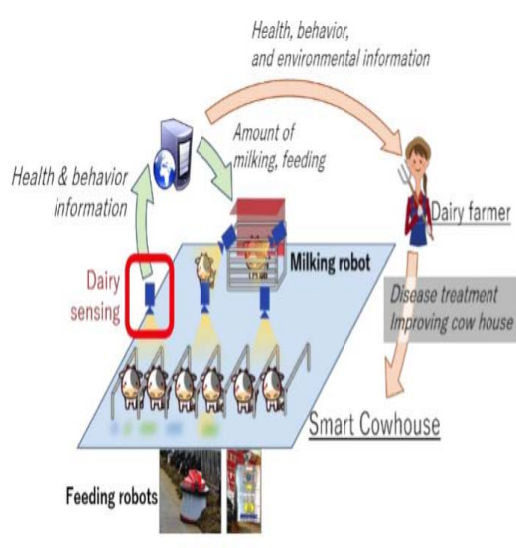
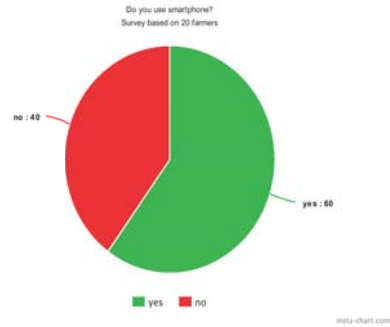


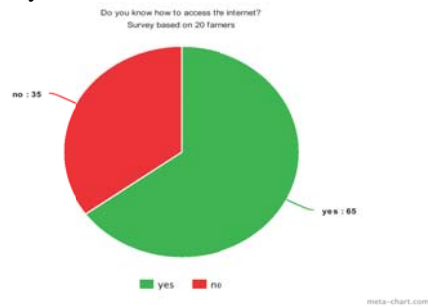
Fig 3: AI in dairy farming

Questionnaires Prepared for the current research

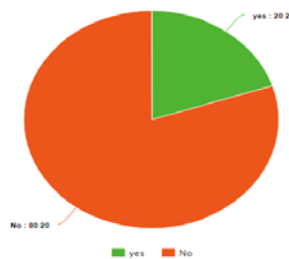
1. Do you use Smartphone?



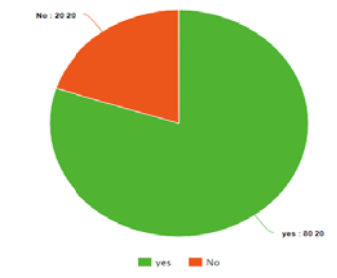
2. Do you know how to access the internet?



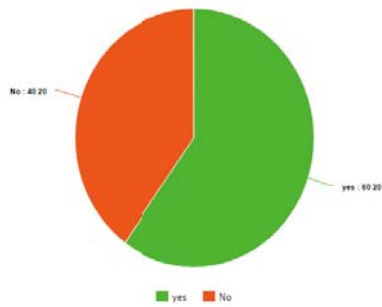
3. Are you aware of the latest technologies used in dairy farming?



4. Will you prefer using new technologies for your dairy farming?.



5. Are you ready to switch from traditional to modern dairy farming?



IV. CONCLUSION

A dairy farmer who is equipped with such technologies can make good production dairy farming. The most out of his cattle and the dairy farmer can focus on other chores as the whole dairy is managed by artificial intelligence.

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Use of Computer Applications in Agriculture

Guided by Prof. Shazia Shaikh

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Abstract -Agribusiness Research have profited from joining of innovative advances fundamentally produced for different ventures. Computer Applications in Agricultural Environments talks about the influence of computers on the industry of agriculture. The modern age conveyed motorization and combined composts to farming. This paper covers a wide range of topics in such as information systems, data mining, bioinformatics, etc. , and can therefore serve as an excellent reference for in the field of agriculture.

Keywords -Bioinformatics; Remotesensing; Precision agriculture

I. INTRODUCTION

The data age brings the potential for coordinating the innovative and modern advances into economical farming creation framework. The utilization of the PC in horticulture examine initially misused for the change of measurable recipe or complex model in computerized cultivate for simple and precise count which are discovered moderately dreary in manual computation. In the people to come, similar PCs have been utilized to motorization, robotization furthermore, to create choice emotionally supportive network for taking vital choice on the agrarian creation and insurance examine. As of late remote detecting and geographic data framework has put a noteworthy and essential part in farming look into particularly in the field of yield forecast, appropriateness of soil for specific harvest, and site particular asset allotment of farming sources of info, and so forth [1],[2],[3].

II. TECHNOLOGIES INCORPORATED

A. Informations Systems

Before we can understand information systems, we should ask what is information? and What is a system? The data is nothing but numbers 0 to 9 arranged in some form. But each number in its location elicits thousands of information if you could properly apply our mind as long as we are close to the objective of the research in our mind. Information can be the questions we continuously ask what, where, when, who, how, how much and the answers we get. On the other hand the system is how we present these data and information in a systematic manner with the help of computer for further mining of the data to acquire knowledge.

There are numerous sorts of data advances, including radars, versatile/phones, FAX machines, PCs, and satellites, to list a couple. These advancements add to many types of data frameworks, for example, frameworks for data recovery and frameworks that assistance us take care of issues or decide. An data recovery framework is a situation of individuals, advances, and techniques (programming) that assistance discover information, data, and learning assets that can be situated in a specific library or, so far as that is concerned, anyplace they exist. Data about accessible assets is gained, put away, sought, and recovered when it is required.

B. Data Mining

Data mining is the process of discovering potentially useful, interesting, and previously unknown patterns from a large collection of data. The process is similar to discovering ores buried deep underground and mining them to extract the metal. The term "knowledge discovery" is sometimes used to describe this process of converting data to information and then to knowledge.

The data mining process is interactive and iterative, and it requires an understanding of the decisionmaker's intentions and objectives, the nature and scope of the application, as well as the limitations of data mining methods. A variety of software systems are available today that will handle the technical details so that people can focus on making the decisions. All most all statistical techniques including bioinformatics we are using are just data mining either it may be in the field of agriculture, medicine or engineering [4],[5].

C. Bioinformatics

Bioinformatics incorporates the advances in the regions of Computer Science, Information Science and Information Technology to take care of complex issues in Life and plant Sciences. Science relied upon science to make significant steps, and this prompted the improvement of organic chemistry. Likewise, the need to clarify organic marvels at the nuclear level prompted biophysics. The huge measure of information assembled by scientists—and the need to decipher it—requires instruments that are in the domain of software engineering. The present part of bioinformatics is to help agribusiness analysts in

social affair and handling genomic information to consider protein work.

III. ADVANCED TECHNOLOGY

A. Remote Sensing and Geographic Information System

Remote detecting alludes to the way toward social event data around a protest, at a separation, without touching the question itself. The most widely recognized remote detecting strategy that comes to most individuals' psyches is the photographic picture of a question brought with a camera. Remote Detecting procedures have a novel capacity of recording information in unmistakable and additionally imperceptible (i.e. bright, reflected infrared, warm infrared and microwave and so forth.) part of electromagnetic range. In this way certain marvel, which can't be seen by human eye, can be seen through remote detecting strategies i.e. the trees, which are influenced by sickness, or creepy crawly assault can be distinguished by remote detecting strategies much before human eyes see them. Land Information System is a PC based data framework that can obtain spatial information from an assortment of sources, change the information into helpful arrangements, store the information, and recover and control the information for examination. Today, GIS is a multi-billion dollar industry and has moved toward becoming piece of an essential data framework for private endeavors, government offices, and scholarly establishments. The lion's share of the operational GIS are utilized for topical mapping, dealing with spatial inquiries, and basic leadership bolster. The utilization of remote detecting information taken force in the field of farming and harvest thinks about in India particularly trim creation anticipating covering both harvest stock and product yield figure models, dry spell evaluation, soil mapping also, soil debasement, order region observing, surge harm appraisal, arrive appropriateness mapping, creepy crawly bother pervasion anticipating and boundless accessibility of satellite flags that permit private utilization of GPS made it feasible for ranchers to spatially find information from accuracy cultivating applications. GIS innovation is as a rule progressively utilized by horticulture scientists to make asset database and to touch base at fitting arrangements/techniques for practical improvement of rural assets [3].

IV. PRECISION AGRICULTURE

Exactness Agriculture is conceptualized by a framework approach to re-sort out the aggregate arrangement of agribusiness towards a low-input, high-productivity, economical agribusiness. This new approach primarily profits by the rise and merging of a few innovations, including the Global Positioning

System (GPS), geographic data framework (GIS), scaled down PC segments, programmed control, in-field and remote detecting, portable figuring, propelled data preparing, and media communications. Horticultural research is presently able to doassembling more complete information on creation inconstancy in both space and time. The want to react to such changeability on a fine-scale has turned into the objective of Accuracy Agriculture [4].

A. Expert Systems

A specialist framework is a particular sort of data framework in which PC programming serves a similar capacity expected of a specialist. The PC, modified to impersonate the manners of thinking of specialists, furnishes the leader with proposals with regards to the best decision of activity for a specific issue circumstance. The expectation is that we can plan PCs (data frameworks) that stretch out our capacity to think, learn, and go about as a specialist. Master frameworks enable clients to impact the learning of specialists without requiring their quality. Master frameworks are helpful in any field particularly in farming where specialists are uncommon, costly, or blocked off. The learning base is the center segment of any master framework since it contains the learning gained from a specialist in the field and from distributed writing. Ordinarily, a learning engineer is in charge of working with a specialist to fabricate the learning base for the framework. The information design must perform a detailed investigation of the surmising procedure and build up the model learning base. The errands associated with building up any learning base incorporate information acquisition, knowledge portrayal, learning programming, and information refinement [5], [6].

V. CONCLUSION

Use of Internet has given the globe a shrinking effect. Every kind of information is only a few clicks away. In today's world of competition –information” is the key word to success. This papers discuss advantages and innovations in Information Technology incorporated technologies and advanced technology such as remote sensing and use of expert systems.

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Farmer to Consumer – Digital Marketing

Guided by Prof. Brijesh Pandey

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Abstract -This paper investigates the significance of F2C direct marketing and the long felt need of the farmers and consumers of the nation as it goes far in guaranteeing direct sale of the agricultural commodity by the agriculturists to the purchaser at moderate costs as well as the transportation difficulties confronted by agriculturists and arrangements over the same.

Keywords –Digital Marketing

I. INTRODUCTION

Farm direct marketing involves selling a product from the farm directly to customers. Direct marketing of horticultural deliver helps in complete elimination of ‘middlemen’ and commission operators who charge abnormal state of commission expense from the agriculturists/farmers coming to the market yards for selling their produce and then artificially inflate the retail prices.

Numerous cultivators opt to direct market their items since it takes into account better potential net revenues contrasted with offering the discount. The advantages acknowledged by removing the mediator and getting immediate input from the client can make these marketing avenues worth the labor required to sell directly.

This approach avails the farmer to accrue a price similar to what the grocery store charge. Scope: - Maharashtra CM Mr. Devendra Fadnis unlatched Mumbai’s initial “farmers to consumers” market on the premises of the Maharashtra assembly at Nariman Point. This followed a mandate to discard the deal and buy of vegetables and fruits from Maharashtra’s APMC Act and permit their deals outside APMC-regulated markets. Maharashtra State Agricultural Marketing Board’s (MSAMB) Patil says this intercession has furnished farmers with a legitimate system to operate outside APMC markets with no permit.

It is not obligatory for agriculturists to bring them create to APMC advertises as it were. The lawful arrangement is that purchasers authorized by Maharashtra’s directorate of agribusiness advertising can buy cultivate deliver from farmers.

Since little amounts of farm items can be sold, little makers can take an interest.

The agriculturist sets the cost or is more control of the cost. Great items and administrations can get appealing costs and, in this manner, little homesteads can be gainful. Instalment is typically prompt. What’s

more, agriculturists get moment input from clients on items and administration. The farmers can enhance his/her business through this information and increment cultivate productivity.

II. PROBLEMS

Agriculturist assume praise for right around a numerous thing like seeds, inputs, composts and so forth. The yield is prepared, and this is the time he needs to pay his obligation (He can’t store his item as obligations to pay and no place for storage). The agriculturist stacks the harvest in a tractor or any vehicle and go to mandi (Remember the deliver is in extensive amounts as in quintals and tons).

The market is overflowed with the create so for all intents and purposes every one of the distribution centres are full.

A man sitting in APMC mandi cites some irregular value which is not adequate to the rancher. What decision does the agriculturist have? Nothing, as we have precluded all the conceivable options. He has to sell it at whatever cost cited by that operator (called commission specialist CA). Similarly, if inside transport costs in a nation are extensively high then the degree for farming fares will likewise endure when contrasted with other more proficient nations.

Transport makes showcase for farming produce, enhances cooperation among geological and monetary districts and opens up new territories to financial core interest. There are many-sided connections that change both spatially and after some time amongst transport and advancement. However, for any improvement to happen, transport assumes a critical part. As indicated by Ajiboye and Afolayan (2009), street transport is the most well-known and complex system.

It incorporates wide range, physically advantageous, exceedingly adaptable and for the most part the most operationally appropriate and promptly accessible methods for development of products.

The transportation is not free, so no choice of taking the create back home. Even though trucks are progressively utilized as a part of transporting perishables, the cost of transportation is by and large high. Subsequently, the agriculturists get a low profit for their deliver.

It is distinguished that vehicle costs have basic part in perceiving the connection amongst availability

and farming advancement. Great transport framework is fundamentally vital to capable farming advertising.

III. INFLUENCED PEOPLE

Direct selling market size in India is given in Fig 1.

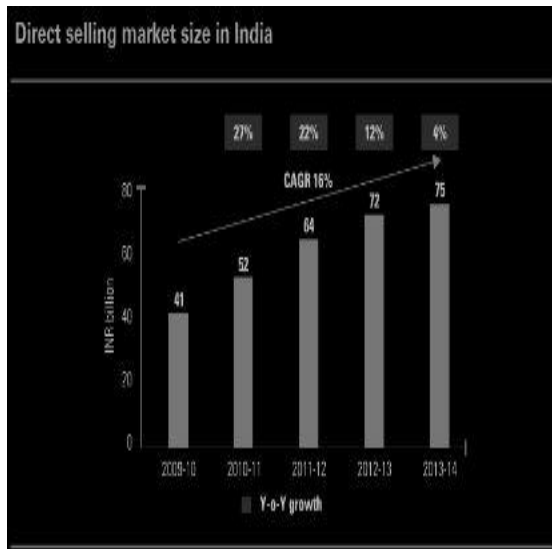


Fig 1: Direct selling market in India

IV. STEP BY STEP SOLUTION

As farmers acquire less cost for them create because of different issues specified earlier, here are a portion of the answers for act of spontaneity: The government must furnish farmers with low rate transport facility.

The legislative body ought to likewise expand the storerooms or space with the goal that it can enable the agriculturists to store their deliver for advance dispersion to process. This may lead the farmers to assembled certainty for the development of more creation and diminish the dread of wastage of goods before they are being promoted.

The judicial committee need to monitor the plans it has accommodated the farmers with and furthermore contact the localized NGO's for in-person communication with farmers i.e. face to face conversation, this may likewise help in edifying the genuine reason for not adjusting to these govt. plans. A beneficial scheme must be introduced by our legislative body for the farmers to deliver the farm product from the farmers to the appropriate market or warehouse.

The legislature should likewise consider the prosperity on streets amid transportation from little towns to remotely found markets, as streets are not fit as a fiddle. Because of various potholes, asphalt splits and wrong repairing of the same. As a reason of farmers need to help their deliver through bullock

carts along these lines prompting moderate transportation facilities.

V. CONCLUSION

The improvements beneficial for plans initiated by the government must be considered, which can aid the farmer's financial condition more efficiently thus providing him an appropriate outcome of its farm produce.

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Genetically modified Crops a Boon or Bane

Guided by Prof. Shirshendu Maitra

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Abstract -If the population continues to expand and if plant diseases continue unchecked, soils are depleted, and our supply of traditional food sources is depleted by overconsumption and slow renewal, we may face severe food shortages in coming decades. Some of the scientists and producers of food believe that genetically modified food crops would be able to help in solving problems of matching food supply to demand, but many other researchers and health advocates are also opposed to the further development and widespread use of genetically modified foods, which they feel carry health risks and could have a negative impact on the ecosystem.

Keywords –BT Cotton; BT Brinjal;

I. INTRODUCTION

Genetically modified foods are prepared by altering the genetic make – up of plants by inserting genes from one species artificially into another one. The essential reason they were introduced was because it was supposed that they would ensure an adequate food supply for the world population that is growing at an alarming rate. These foods increase resistance to pests and herbicides and therefore help in eliminating the use of chemical pesticides and various time consuming and expensive processes to destroy weeds. More importantly, in countries like India, it is believed by experts that these foods would also help in removing malnutrition as normal foods can be genetically engineered to contain additional vitamins and minerals. Genetically modified crops (GM crops) are plants whose DNA has been modified using genetic engineering techniques and are used in agriculture. More than 10% of the world's crop lands are planted with GM crops. In most cases, the aim is to introduce a new trait to the plant which does not occur naturally in the species like resistance to certain pests, diseases, environmental conditions, herbicides etc. Genetic Modification is also done to increase nutritional value, bioremediation and for other purposes like production of pharmaceutical agents, biofuels etc. [1],[2][5].

II. NEED FOR GM CROPS IN INDIA

There is a very grave food crisis looming over India. Farmers in India are currently losing approximately about Rs. 50,000 crore (\$5 billion)

each year to elements like pests and diseases. Droughts

along with a shortage of irrigation facilities are worsening the problem.

Prices for a category of grains (pulses) that contain food like lentils, chickpeas, etc. which are popular staples for the citizens have been increasing lately. The current scenario may become even worse as the United Nations estimates that India's population, right now at 1.2 billion, will surpass 1.8 billion by 2050[1]. Scientists have proposed a solution: to use genetically modified (GM) crops that have the ability to withstand pests and droughts. But even before the farmers can avail the benefits of these GM plants, scientists will need to convince the current Prime Minister of India- Narendra Modi and his government about the safety and cost-effectiveness of this type of crops.

Genetic modification in crops involves altering a seed's DNA in order to, say, increase its resistance to pests and insects. These things can cause a huge increase in productivity and overall supply of food. GM foods are fairly common in the US who cultivates eight crops using this technology [2],[3][7].

III. STATUS OF GM CROPS IN INDIA

Indian government has yet to approve commercial cultivation of a GM food crop. The only genetically modified crop allowed for commercial cultivation in India is cotton [3],[4].

A. BT-Cotton

BT stands for *Bacillus Thuringiensis* which is a bacteria that naturally produces a protein i.e. a biological pesticide which is said to kill the problem of the common crop pest called bollworm. It was approved for use in India in 2002, and since then has assisted the country to become the second-largest manufacturer of cotton in the world. Today, GM seeds approximately account for more than 90% of cotton grown in India.

However, in the year 2015, GM cotton plants in the northern states of the country - Punjab and Haryana suffered an attack of the whitefly pest. There were massive losses. Farmer unions and experts have blamed the financial devastation as a reason for the increased number of farmer suicides in these states.

This scenario has created a big sense of negativity towards GM crops in India. Experts suggest that

adopting this technology will lead to greater crop productivity and will be essential to feed the increasing Indian population. Currently, a food supply shortage is inflating prices up and the country has been forced to import pulses and also cultivate foreign farmlands to bridge the demand-supply gap[4],[8],[10].

B. BT- Brinjal

BT Brinjal is another type of GM crop created by inserting the soil bacterium *Bacillus thuringiensis* into Brinjal. The insertion of the gene gives Brinjal plant resistance against lepidopteron insects like the Brinjal Fruit and Shoot Borer (*Leucinodesorbonalis*) and Fruit Borer (*Helicoverpaarmigera*). Upon consumption of the Bt toxin by the insect, there would be interference in digestive processes, finally resulting in the death of the insect. The Bt Brinjal seed was also developed by Mahyco or Maharashtra Hybrid Seeds Company in collaboration with Monsanto. The GEAC had approved permission for field trials of Bt Brinjal in 2009. The rationale behind the approvals was to bring down the economic cost of brinjal production in the country. As per studies, the Shoot Borer and Fruit Borer cause up to 20% damage in the crops. The introduction of Bt Brinjal would add to annual production and it would be good for farm economy in the country. The GEAC in 2007, prescribed the business arrival of Bt Brinjal, which was produced by Mahyco (Maharashtra Hybrid Seeds Company) in collaboration with the Dharward University of Agricultural sciences and the Tamil Nadu Agricultural University. But the initiative was blocked in 2010[3],[6].

C. GM-Mustard

DMH-11 is a Genetically Modified (GM) mustard hybrid. Hybrids are normally obtained by crossing 2 genetically diverse plants from the same species. The 1st-generation offspring resulting from it has higher yields than what either of the parents is individually capable of giving. But there is no natural hybridization system in mustard. This is because its flowers contain both the female (pistil) and male (stamen) reproductive organs, making the plant naturally self-pollinating.

What researcher has done is to make a feasible hybridization framework in mustard utilizing GM innovation. This got GM mustard cross breed crop, is guaranteed to have around 25-30% more yield than the other best assortments of products like 'Varuna' presently developed in the nation [8],[9].

V. THE DISADVANTAGES OF GM CROPS

A. Cross Contamination

The dust from the hereditarily adjusted plants is additionally polluted. At the point

when this dust is around different plants, even things like grass or weeds, they cross fertilize. This could create "superweeds" that have an indistinguishable protection property from the products

B. Allergies on the rise

As far back as the presentation of GMO sustenance's, the measure of youth nourishment hypersensitivities has risen altogether. The correct connect to GMO has not yet been found, but rather numerous trust this is because of deficient research in the region.

C. Less Effective Antibiotics

The harvests that have been hereditarily adjusted have anti-infection properties put into them so as to make them resistant to specific maladies. When you eat these nourishments, these properties are left in your body and can make numerous anti-toxins less viable.

D. Not Enough Testing

There has been next to no testing and research done on hereditarily changed sustenance's and the long-haul impacts have been not found yet. This influences numerous individuals to feel uneasy at the high utilization of these sustenance's [10].

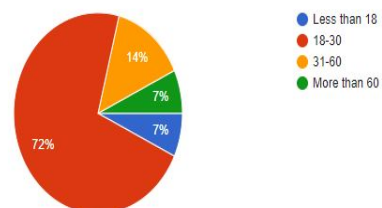
IV. SURVEY

1. What is your Age?
2. Please select your gender.
3. Current level of understanding about genetically modified crops
4. Do you think there is enough information openly available about genetically modified food crops?
5. Are you aware of genetically modified (G.M.) crops?
6. Do you think G.M. crops are healthy?
7. Would you consume G.M. vegetables?
8. Do you think G.M. crops are better than organic crops?
9. Do you think G.M. crops help or hurt the farmer?
10. Do you think that G.M. crops are necessary or unnecessary?

VI. ANALYSIS OF SURVEY

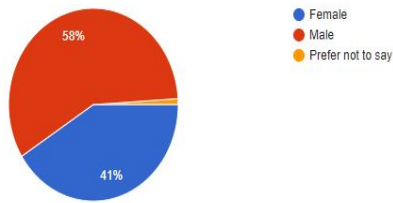
What is your Age?

100 responses



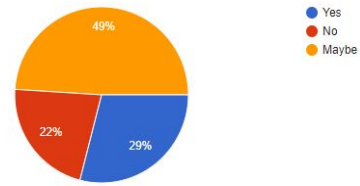
Please select your gender.

100 responses



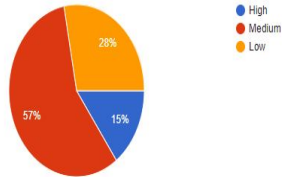
Do you think G.M. crops are healthy?

100 responses



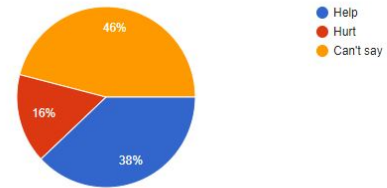
Current level of understanding about genetically modified crops

100 responses



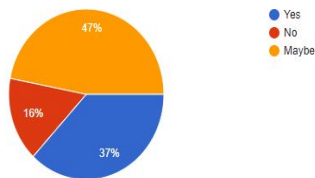
Do you think G.M. crops help or hurt the farmer?

100 responses



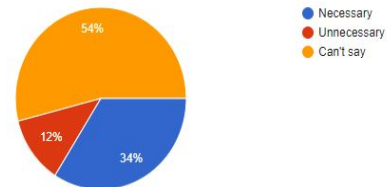
Would you consume G.M. vegetables?

100 responses



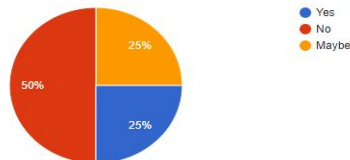
Do you think that G.M. crops are necessary or unnecessary?

100 responses



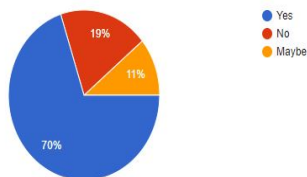
Do you think there is enough information openly available about genetically modified food crops?

100 responses



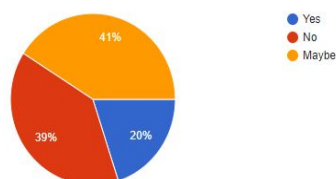
Are you aware of genetically modified (G.M.) crops?

100 responses



Do you think G.M. crops are better than organic crops?

100 responses



Important Numbers:

70% of the respondents knew about gm crops, 11% of them said maybe they know about them crops and rest straight away said they haven't heard about any of such crops

50% of the respondents feel there is not enough information available about gm crops, 25% feel there is sufficient information about them and rest said may be.

15% of the respondents said they have high knowledge about gm crops, 57% had medium and rest of them had quite low knowledge about these gm crops.

54% of the respondents cannot currently comment on the necessity of gm crops, 34% supported its necessity and rest felt gm crops are not necessary at this moment.

49% of the respondents agree that maybe gm crops are healthy than organic crops 29% said yes, it is, and rest objected them.

47% of the respondents said maybe they would try to consume gm food crops, 37% said yes definitely and rest voted for no.

46% of the respondents cannot say whether these gm crops would be able to help farmers, 38% supported that it would help, and rest said it would hurt the sentiments of our Indian farmers

VII. CONCLUSION

From the survey analysis, we can conclude that a lot of people are aware about genetically modified crops and maybe they would try them if our country commercializes it as they feel maybe gm crops are healthier than organic crops with some added benefits to it. but still they feel there is a need to educate the masses since there is not a lot of information available about them majority of the respondents cannot determine whether the commercialization of gm crops will be beneficial for our country as well as farmers or will it leave us into a disastrous situation. Majority of the respondents have an average knowledge about them and they cannot comment on its necessity today since they feel there should be a proper diversification of its pros and cons and field testing to determine do we have a future with gm crops or not.

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ARTICLES

Reason behind the Farmers committing suicide

Guided by Prof. Atul Tiwari

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Abstract - This paper discusses the important reasons because of which farmers commit suicide. Many technological advances have come up which has led to development of new tools and equipment's that majorly focuses on agriculture. But, we have mostly concentrated on Farmers rather than on farming. According to a survey done most of suicides are due to bankruptcy, they cannot repay the loan provided to them on time. The demand of Farmers is: they need better price for their produce, need better agricultural pension, loan waiver through a detailed survey, we have identified possible gaps in Agriculture and have provided recommendations on the suicide rate of farmers be decreased.

Keywords – Suicide; Debtedness; Bankruptcy; NCRB

I. INTRODUCTION

This India is an agrarian country with around 70% of its kin depending straightforwardly or by implication upon horticulture. Many Commentators and researchers claim that farmers are the most distressed group in the country as the suicide rate are becoming higher and increasing year by year. They also claim that farmers group need proper counselling. National Crime Research Bureau (NCRB) provides statistics for the suicide rate in India. A rebuilding of the suicide rates by economists Deepankar Basu and Kartik Mishra of the University of Massachusetts, Amherst and Debarshi Das of IIT-Guwahati published last year in the Economic and Political Weekly disclosed that except for Kerala and Maharashtra, the ratio of suicide rates (or the suicide transience rates, as the researchers define the rates) for farm-related workers and non-farming workers was less than one in all the states between 1995 and 2011. Maharashtra is the most affected state for farmer's where famers suicide. Over 12,000 famer's suicide every year. Various reasons have been introduced to clarify why ranchers confer suicide in India, including: floods, famine, debt, public health, use of lower quality pesticides due to less investments producing a declined harvest and also government economic policies.

The Government of Maharashtra became anxious about the highest total number of farmer's Suicides among its rural populations, specially made its own study into reasons. At its behest, Indira Gandhi Institute of Development Research in Mumbai did field research and found the top causes of farmer's suicides to be: dues, low pay and crop failure, family issues such as illness and inability to pay celebration expenditures for daughter's

marriage, lack of secondary income occupations and lack of value-added opportunities.

The banking sector of India has come up with many schemes for the farmers so that famer's don't have to worry about the money deposition. These schemes sometimes prove to be beneficiary for the farmers.

II. DEVELOPMENT AND MANAGEMENT

Study also claims that farmer's suicide in India may be linked to changes that take place in the climate. Increase in temperature leads to crop yield reduction. As discussed above the various reasons about the farmer's committing suicide. The study found out that these there are some natural factors responsible for farmer's death but did not found measure e to prevent it. The preventive measures and strategies used by other nations may not necessarily be the same for the Indian farmers. Lively participation by psychiatrists in prevention and investigation work in the field of farmers' suicide is now being recognized in India. Farming done in South Indian countries like Andhra Pradesh and Karnataka has been successfully. But for Maharashtra the case is different.

Possible Solutions can be:

- Agriculture dependency on nature should be reduced by water management schemes.
- The farmers must be guided and advised with the utilization of funds.
- Organic farming must be fortified.
- The extreme powers of the money lenders must be checked.
- Middle men should be eliminated.

III. GROWTH

There is a need for social and cultural awakening with in the village communities. In 1998, World Bank's structural adjustment policies forced the government to replace farm saved seeds with corporate seeds. The Indian farmers are forced to buy the high-priced seeds manufactured by the multinationals. The small farmers in India are the major farming community and the largest farming community in the world was badly affected due to these changes. This community is on the boundary of extinction due to the conditions imposed by WTO. The World Bank's structural adjustment policies enforced India to open up its seed sector to global corporations in 1998.

Steps Modi Government has taken to tackle suicide rates of farmers:

A. 70% Cut in Monsanto’s Payments

Modi government declared a 70% cut in the payment that the local firms pay Monsanto (American multinational agrochemical and agricultural biotechnology corporation). For its cotton seeds. With such deep cut in its revenue which Monsanto has been blamed of jacking up due to its monopoly.

B. Pradhan Mantri Krishi Sinchai Yojana

This is the national mission of under PM Modi government to expand the irrigation in the country and enable the agriculture to become unaffected to the impulses of Indian monsoon.

C. Pradhan Mantri Fasal Beema Yojna (Insurance of crops for Farmers)

Another important move required to fight the issue if, farmer’s suicide is still present. This new scheme will provide compensation for the losses acquired by the farmer.

D. Soil Health Card

Government issues soil card to farmers which has crop wise recommendations on nutrients and fertilizers that are required by farmers for farming in order to increase the productivity and enhance the crop yield. In India there are many soil testing labs which tests the samples of soil.

Till date, with the help of technology government has been developing many new tools and equipment’s that support farming. But, here, initial consideration must be Farmers.

Collective Knowledge should be known about the farming.

IV. PROBLEMS

The Farmers are uneducated, disorganized and doesn’t understand the financial activities that happen around them. Due to the lack of Agricultural Marketing Farmers become the innocent victims of poverty and Bankruptcy. Here, the middlemen and money Lenders come into the picture. They apply their own tactics and make farmers victim of their own thoughts and actions. Other Reasons for farmer’s committing suicide is imbalanced Supply chain:

- Distress Sale
- Lack of transportation facilities
- Unfavourable Mandis
- Intermediaries
- Lack of market intelligence
- Dalal and local agents
- Improper Agricultural Marketing

Suicides reported amongst Farmers	
2014-2015	122
2015-2016	1478
2016-2017	848

V. CONCLUSION

By keeping in view, the problems, the farmers are facing committing suicide, it is the duty of supervisory governments to ensure that such incidents must not happen and should take essential steps to lessen the suicide rates and rescue the farmers. The state is looking forward on how to eliminate these problems. Every sector in business provides many services like manpower, equipment etc.

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Implementing Machine Learning with Polyculture to create Market Balance, maintain Soil Fertility and reduce Crop Wastage

Guided by Dr. Vinita Gaikwad

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Abstract - Some farmers decide to follow the Monoculture approach of farming where a single crop is grown on the same soil over and over again. Whereas some of the more educated farmers know the negative effects of Monoculture and have adopted the culture of Polyculture. Although Polyculture is a good way to maintain the fertility of the soil, each farmer thinks on the individual basis and decides the multiple crops to grow on his own farm without considering the impacts of neighboring farms and market demands.

Keywords – Monoculture; Polyculture

I. INTRODUCTION TO FARMING CULTURE & THEIR DRAWBACKS

There are primarily two types of farming cultures:

A. Monoculture

Monoculture is the agricultural practice of producing or growing a single crop, plant, or livestock species, variety, or breed in a field or farming system at a time. This culture is usually passed on by families such that a single family grows a certain type of crop on their farm. Growing the same crop again and again reduces the diversity of crops on the farm and in turn eliminates all the functions that nature provides to the soil. Growing the same crop in the same place for many years in a row disproportionately depletes the soil of certain nutrients. Because the soil starts losing its nutrients for growing the same crop, more synthetic pesticides are used to increase the yield which again harms the soil.

B. Polyculture

Polyculture is where more than one crop is grown in the same space at the same time, is the alternative to monoculture. Polyculture is widely used in both industrial Farming and organic farming and has allowed increased efficiency in planting and harvest. Polyculture helps maintain the fertility of the soil by rotating the crops. Usually farmers decide a specific set of crops to grow on their farms and keep repeating the same crops. They do not consider the impact of the adjoining farms on their soil fertility and what impact their crops could have on the adjoining farms. Because of the trending Polyculture,

there have been a lot of market fluctuations because of the inconsistency of the crops. Some crops are available in excess whereas some are rarely produced. This leads to high demand of certain crops and wastage of certain other crops

II. PROPOSED SYSTEM

With the advancements in technology and the field of machine learning, we can implement these in the betterment of Polyculture. The new proposed system will collect nutritional data from all the farms of a particular area, analyze and decide which kind of crops are suitable for the soil. Then relate this data with the market trends and demands, and finally assign each farm a crop to grow depending on their soil, the assigned neighboring crop and the market trends. This will ensure the market stability so that no crop is grown in excess and none of the crops are wasted.

Variables to be considered in the new system:

- Crops on adjoining farms
- Market demands
- Soil type
- Past crops on the soil
- Weather conditions

III. LITERATURE SURVEY

The study was performed as a literature review. The motivation for restricting the analysis to articles from ISI-listed journals was to stay within the boundaries of internationally accepted scientific quality management and worldwide access. About the drawbacks of an index system based on abstracts instead of citation indexes, which is not as transparent as the Core Collection regarding the database definable by the user.

Because most performance-based funding systems have been introduced since 2000, allowing sufficient time for the approaches to evolve and literature to be published.

IV. RESULT

This review aimed at providing an overview of impact assessment activities reported in academic

agricultural literature with regard to their coverage of impact areas and type of assessment method used.

We found a remarkable body of non-scientific metric RIA at all evaluation levels of agricultural research but a major interest in economic impacts of new agricultural technologies.

These are closely followed by an interest in social impacts at multiple assessment levels that usually focus on food security and poverty reduction and rely slightly more on qualitative assessment methods.

In contrast, the assessment of the environmental impacts of agricultural research or comprehensive sustainability assessments was exceptionally limited. They may have been systematically overlooked in the past, for the reason of expected negative results, thought to be covered by other impact studies or methodological challenges.

RIA could learn from user-oriented policy impact assessments that usually include environmental impacts. Frameworks for RIA should avoid narrowing the assessment focus and instead consider intended and unintended impacts in several impact areas equally.

It seems fruitful to invest in assessment teams' environmental analytic skills and to expand several of the already developed methods for economic or social impact to the environmental impacts. Only then, the complex and comprehensive contribution of agricultural research to sustainable development can be revealed.

V. QUESTIONNAIRE

The questions designed for questionnaire is listed below:

- Which crop do you grow often?
- Is there a crop that you grow because your father used to grow it?
- Do you talk to your neighboring farmers and decide which crops to grow?
- Why do you grow the specific crop so often?
- How much quantity of wastage of crop occurs for your often-grown crop?
- Is there any other crop that you have grown previously that caused more wastage?
- Why do you think the crops are wasted as much as they do?
- Do you always get paid sufficiently for the crops you grow?
- What are the reasons for not being paid what you deserve for a crop?
- Do you use any mobile technology to enhance your farming?
- What other technology do you use for farming?
- Are you comfortable with using a smartphone?

VI. MECHANISM AND SOLUTION

Principles to Consider:

- Mimic the structure of natural vegetation.
- Use native perennial plants.
- Plant compatible species.
- Maximize natural processes.
- Place crops to ensure optimal interaction.

Farming Methods:

- Crop rotation: growing dissimilar crops sequentially on the same field.
- Multi-cropping: the cultivation of two or more crops in the same area simultaneously.
- Inter-cropping: the planting of smaller crops between the spaces of the larger crops.

VII. CONDITION OF SUCCESS

To grow polycultures successfully in any setting, three key skills need to be developed: Ecology, Horticulture, and Design. In addition, cooperation and project management skills are vitally important for long-term success. Security of tenure is a pre-condition for long-term investment in perennial crops. A specific cultivation challenge is the design and maintenance of an effective ground cover. This requires some understanding of the spreading patterns of perennial plants and their complementarity with the crops they are to be combined with.

VIII. CONCLUSION

Polyculture is the most efficient method to maintain the soil quality and have a good yield, combining that with our proposed system the farming can be done on a large scale by considering each and every farm to maintain the over soil fertility and create a balance of crops in the market which will prevent the sudden hike in prices of certain crops and will lead to a huge reduction in crop wastage for those crops which were grown in excess on multiple farms

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Smart Irrigation using Moisture Sensor

Guided by Prof. Shirshendu Maitra

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Abstract - The population around the world is increasing rapidly and in the coming future the need for food also grows gradually which increases the importance of agriculture. Agriculture plays an important role in Indian Economy. There are different methods that can be followed for irrigation. Irrigation needs to be controlled as both under irrigation or over irrigation can harm the crops. So with the help of new technologies, we improvise the existing system to make them more efficient and useful.

Keywords – Sensors; Arduino;

I. INTRODUCTION

With the increasing population, the expectations from the agriculture sector have also increased. To fulfil these needs completely and on time, there are many different technologies used for agriculture. Traditional methods tend to slow down the process of timely delivery of products. Traditionally farmers make use of motors and long pipes to complete the irrigation process. Now the use of these technologies makes us realize the process of irrigation to be simple and easy but it's not. The use of these technologies requires constant human intervention [1]. Also, if not monitored properly, these methods can cause lot of damage to the crops leading to wastage of water, crops, time and money. To improve these traditional methods, we can make use of IoT technologies to automate our agriculture processes. This involves making use of sensors to detect the level of moisture in the soil and provide only adequate amount of water to the crops so that there is no over irrigation. So, after detecting the moisture level, that particular pipe would stop supplying water to the crops. This provides a way to reduce the levels of water consumption.

II. WORKING PRINCIPLE

The most important component of this implementation is the Arduino micro controller unit. The moisture sensor helps us to detect the moisture level present in the soil. Now the moisture level detected from this soil is sent to the Arduino controller unit. The Arduino controller unit is already pre-programmed in such a way that when the moisture level detected rises above the specified threshold, the water supply through that particular

pipe is stopped automatically. First the moisture level is detected from the soil. This data is sent to Arduino for further processing. The pipe through which water is supplied in the field consists of valves or outlets through which water reaches the crops. These valves are controlled with the help of a relay. The Arduino unit after processing the input decides the amount of water to be supplied to these crops. If the moisture level in soil is more than the specified threshold, then the valves are closed by the relay and the water supply is stopped automatically for those crops [2].

If the level is less than specified level, then adequate amount of water is supplied through that valve. Thus, the implementation of such methods helps us remove the human intervention or at least minimize the efforts. The future implementations that can be applied for this system are solar panel and rain water harvesting. Solar panel would help us to reduce the power consumption and rain water harvesting would help us to make and maintain water storage [3].

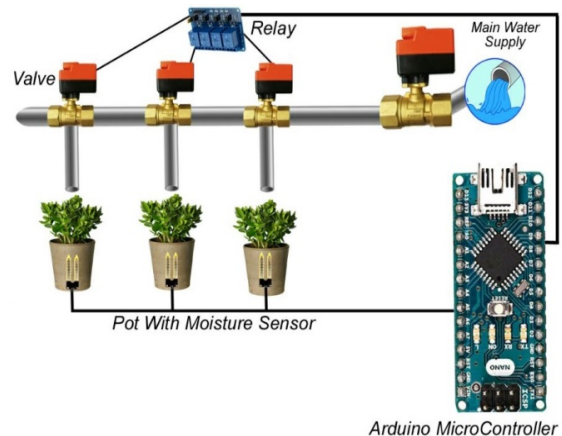


Fig.1: Arduino Microcontroller

III. ADVANTAGES

1. Water consumption for irrigation is controlled.
2. The system is safe to use with low cost and maintenance.
3. Human intervention is removed or is brought to minimal level.
4. System is easy to implement.
5. It is a one-time investment.

6. The system works automatically without the use of any application or remote.

IV. DISADVANTAGES

1. Little costly than manual implementation.
2. Power supply is necessary to run the IoT devices used in the system.
3. Damage to Arduino unit needs complete change of the unit from the system.

V. FUTURE IMPLEMENTATION

This system can have solar panel as its future implementation. Using solar panels, we store the solar energy into a battery. This battery can then be used to supply power to the system. So, this minimizes the energy consumption to minimal level and saves electricity [6]. Also, we can implement the concept of rain water harvesting. Using green house, we can collect the rain water in a tank that can be used to water the crops. This further reduces the water consumption level. Also greenhouse prevents the crops from direct sunlight that can cause harm to the crops.

VI. CONCLUSION

In this paper, a research on a smart irrigation system has been discussed. An irrigation system that would work automatically is attracting best deal of interest.

This system would help us remove or minimize the continuous human involvement. Also, the system will minimize the water consumption so that only required amount of water can be used. Even if there are some disadvantages, but they can be eliminated by being careful in further research. Smart Irrigation system has stepped forward invention in the world of growing technologies. This system can solve the problems related to irrigation which we are facing these days. However, in future it will be beneficial to all the common people as it will solve all the problems by reducing human intervention and minimizing the water consumption levels.

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Micronutrients in Human Ageing

Guided by Dr. Vinita Gaikwad

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Abstract- Micronutrients play a central part in metabolism and in the maintenance of tissue function. An adequate intake therefore is necessary. Subclinical deficiency, often of multiple micronutrients, is more difficult to recognize, and laboratory assessment is often complicated by the acute phase response. Clinical benefit is most likely in those people who are severely depleted and at risk of complications and is unlikely if this is not the case. The best evidence for benefit is in critical illness, and in children in developing countries consuming a deficient diet.

Keywords – Diet; Nutrition; Vitamins; Minerals;

I. INTRODUCTION

A. Purpose

The purpose of this paper is to examine the potential role of micronutrients and omega-3 fatty acids in promoting healthier ageing.

B. Methodology

A literature review was conducted using and key words relevant to ageing, nutritional status, nutrient intake and disease risk.

C. Multiple-Micronutrient Supplementation

New research opportunities and requirements where the diet is nutrient-rich and the environment benign. One can assume that all of the nutrients needed for growth and nurture will be consumed, absorbed and retained. Cultural evolution, however, has forced human populations to subsist on an increasingly narrower variety of food items, dominated usually by one or two staple crops: grains, tubers, or both. The evolutionary transition of humans from hunter-gatherers to agriculturalists reduced the micronutrient density of the diet. As a consequence, multiple micronutrients are consumed below recommended amounts by all but the most affluent of societies. Combined with parasites, infections, and chronic inflammatory stress, all of which reduce retention of dietary nutrients, humans became vulnerable to having a lower reserve of micronutrients than is necessary for optimal.

D. Assessment of the situation

Where are interventions warranted? Where are they contraindicated? To address these questions, a series of diagnostic indicators for at-risk

populations are needed. Three strategies can be employed to assess the nutrition situation:

- (1) Social and environmental predictors alone,
- (2) Biomarkers of exposure and status alone, or
- (3) A combination of both classes of indicators.

Although much of the concern for researches related to its development and implementation, it cannot be overlooked that knowing where and when to and not to intervene is an important concern. Diagnostic tools that are both acceptable and innocuous but also reliable and cost-effective are needed for many of the nutrients of public health interest.

Moreover, indices of nutrient overload are needed to avoid causing harm to some individuals in a population in which other, more deficient segments are being benefited by a micronutrient intervention. Fig 1 shows micronutrient sources.



Fig 1: Micronutrient sources

II. SAFETY ISSUES

It is no accident that the classic expression for the suitability for use of a medicine is “safe and effective” (in that order). With respect to multicurrentdeficiency research, safety should also occupy a position no supremacy. At the scale of the study population to be enrolled in a study, precautions should be made to assure safety. But

within the design of research, even if it begins by looking at efficacy as the primary outcome, there must be allowances to detect any negative effects of the intervention.

An implicit aspect of this concern for safety is that adding more micronutrients to an individual's diet, even in those at risk of micronutrient deficiency, may have negative consequences. The following three possibilities must be considered:

- (1) That health protection can be achieved by inducing or maintaining a lesser nutrient status in a population,
- (2) That damage to health can result from dosing individuals with additional micronutrients in interventions,
- (3) That nutrient imbalance can be produced by high dose supplementation by a single micronutrient.

III. TECHNICAL AND ETHICAL CONSIDERATIONS

The research needs for studying micronutrient deficiencies can be interpreted at two levels:

1. The ways to conduct it correctly (tactics)
2. The selection and priorities of research issues (strategy).

A. Findings

The NFHS showed that intakes of vitamin A, B2, B6, folic acid, iron, calcium, magnesium, zinc and iodine fell below recommended levels for groups of older people. Vitamins and mineral supplements may improve nutritional status, lower the risk of deficiency, and impact favorably on disease markers. The Fig 2 shows micronutrient foods.

B. Practical Implications

The evidence suggests that dietary interventions and supplementation may become increasingly important in maintaining health and quality of life in older people.



Fig 2: Micronutrient foods

IV. CONCLUSION

This paper highlights the positive role of nutrition in healthy ageing. Safety issues play an important role in the micronutrients in ageing process. It is important, therefore, to emphasize the relationship between health and micronutrition in the elderly, particularly with regard to micronutrient foods.

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Precision Agriculture using Zigbee Technology by Wireless Sensors

Guided by Prof. Shirshendu Maitra

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Abstract -Wireless sensing element Networks (WSNs) have attracted a huge attention in recent years. They are used for aggregation, storing and sharing perceived information. WSNs are used for various applications as well as surroundings observance, agriculture, setup management, and security. The WSN system development is to be used in preciseness agriculture applications, wherever real time information of climate and different environmental properties are perceived and management selections are taken supported it. The victimization zag bee (low value and low power for energy economical and price effective intelligent devices for information transmission) Technology, it's attainable to observe and transmit the info and perform some action.

Keywords - Wireless Sensor Network; Precision Agriculture; ZigBee Technology; Grid Topology

I. INTRODUCTION

Precision agriculture may be outlined because the art and science of victimization advanced technology to boost crop production. Wireless device network may be a major technology that drives the event of exactness agriculture. Automation in agriculture brings about a fundamental contribution to what is now known as precision agriculture or precision farming[1]. In recent time, the WSN technology has found its place in precision agriculture as a result of the need for high productivity. A definition of precision agriculture may be the following: the technique of applying the right amount of input (water, fertilizer, pesticide, etc.) at the right location and at the right time to enhance production and improve quality, while protecting the environment. This paper focuses on the application of a wireless sensor network application in agriculture.

II. WIRELESS SENSOR NETWORKS

The design of a WSN system contains of a collection of sensing element nodes and a base station that communicate with one another and gather native info to form international selections regarding the physical setting. This is shown in Fig 1.The architecture of WSN varies for an individual sensor node and the entire network.

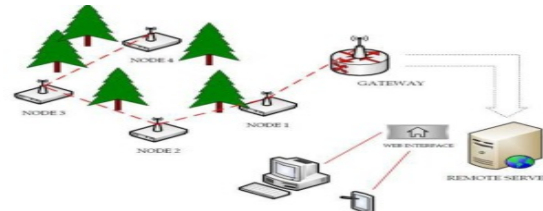


Fig 1: Wireless Sensor Network

III. WIRELESS STANDARDS AND PROPRIETARY WIRELESS SENSOR TECHNOLOGIES

There exist four task teams among the 802.15 social unit. Task cluster one (802.15.1) outlined a customary for WPANs supported the physical (PHY) and raincoat layers of the Blue-tooth specification version one.1. Task cluster 2 (802.15.2) is developing a model for the existence of local area network (802.11) and WPAN (802.15). Task cluster 3 (802.15.3) is developing standards for top rate WPANs (20 Mbps and greater). Task cluster four (802.15.4) is chargeable for developing PHY and raincoat layer standards for low rate and low complexness solutions. The IEEE 802.15.4 customary may be a physical radio specification providing for low rate property among comparatively straightforward devices that consume token power and generally connect over short distances. it's ideal for observance, control, automation, sensing and chase applications for the house, medical and industrial environments [3].

ZigBee may be a wireless networking customary that's aimed toward device and detector applications that is appropriate for operation in harsh radio environments and in isolated locations. The ZigBee standard supports three device types: Zig- Bee Coordinator, ZigBee Router, and ZigBee End Device. Each device kind implements varied levels of practicality with associated price impacts. Thus, equipment makers and system developers might implement topology and trade-off practicality with overall price. ZigBee is established by the ZigBee Alliance that's supported by over seventy-member companies. It adds network, security and application computer code to the IEEE 802.15.4 standard as a result of its low power consumption and straightforward networking configuration, [5] ZigBee is taken into account the foremost promising for wireless sensors. Currently, the ZigBee

specification remains underneath development. Table 1 compares the three wireless standards that area unit best suited for wireless. ZigBee is additional appropriate for application.

Table 1:Comparisonof three wireless standards

Feature	Wi-Fi (IEEE 802.11 b)	Bluetooth(IEEE 802.15.1)	ZigBee (IEEE 802.15.4)
Radio	DSSS1	FHSS2	DSSS
Data rate	11 Mbps	1 Mbps	250 kbps
Slave enumeration latency	32	7	64,000
Node per master	Up to 3 s	Up to 10 s	30 Ms
Data type	Video, audio, graphics, pictures, files	audio, graphics, pictures, files	Small data packet
Range (m)	100	10	70
Extend ability	Roaming possible	No	Yes
Battery life	Hours	1week	>1year
Bill of material (\$)	9	6	3
Complexity	complex	Very complex	simple

IV. CONCLUSION

Precision agriculture and WSN applications mix an exciting new space of analysis that may greatly improve quality in agricultural production, exactitude irrigation and can have dramatic reduction in value required. It is observed a tendency to convey that lower implementation value and therefore build WSN a lot of appealing resolution for every kind of fields and cultivations.

The applications of ZigBee wireless technology in agricultural systems will be extended to real time field observance, automatic irrigation management, monitoring, and remote operation of field machinery.

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Thakur Institute of Management Studies, Career Development and Research was established in the year 2001 with a clear objective of providing quality technical education in tune with international standards and contemporary global requirements, offering 3 years postgraduate degree in Master of Computer Applications (MCA). The Institute is recognized by the AICTE norms and is affiliated to the University of Mumbai.

The Management's commitment to excellence is reflected in the marvelous infrastructure that is comparable to the finest institution of its type in the country. The sprawling campus with lawns, gardens, playgrounds, parking area, hostel accommodation and temple ensures a right academic ambience essential for a center of higher education.

At TIMSCDR, the importance of faculty is well understood which is reflected in qualified and experienced teaching staff. A closely monitored quality, assurance mechanism ensures proper coverage of syllabus within right time frame.

Application of modern technology in teaching-learning process and day to day governance of the Institute makes TIMSCDR unique. The organization supported by dedicated 16 Mbps broadband internet connectivity and also has WI-FI facility.

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