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multidisciplinary e-Newsletter

The practice and implementation of the internet of things (IoT), artificial intelligence & role of cloud computing technology in agriculture fields for zero budget natural farming (ZBNF).

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The Concept of Innovation Organic Farming entered the Agricultural field. The International Federation of Organic Agriculture Moment (IFOAM) has listed a set of international Organic Standards.

INTRODUCTION

As the Indian Agriculture growth is on a decline very rapidly and the youth of Indian turns away from Agriculture, Agriculture fields are on the verge turning into concrete forests. Environmental concerns like global warming, population and health hazards due to chemical and pesticides are also on the rise. the entire country is disturbed due to large scale farmers suicides and the government and several research organizations are grappling with mounting problems.

We as students of Agriculture, along with a renowned Agriculture scientists decided to embark upon a mission to come-up with available solution to the problem of Agriculture in the country. that the issue food security of the country can be addressed successfully Zero Budget Natural Farming (ZBNF).

Zero Budget Natural Farming-(ZBNF):

Subhash-Palekar is the phenomenon of the 21st century. he has developed the complete science of alternative Agriculture in the new world. He is the founder of **"Zero Budget Natural Farming"-(ZBNF).Subhash Palekar** is an Indian Agriculture who participated& wrote many books about **Subhash Palekar Natural farming- (SPNF).**

Formerly **ZBNF Zero Budget Natural farming** managed by Natural Resources.Many professionals in India & abroad like engineers, doctors, lawyers have taken up to **ZBNF** leaving their lucrative jobs. This symbolizes the rapid acceptance of the changing.

Autobiography:

Born: 2nd-Feb-1949

Place of birth: Belora(village), Vidarbha region.

State: Maharashtra

Education: Bachelor's Degree in Agriculture- Nagpur.

Nationality: Indian

Occupation: Agricultural Scientist, Philosophy Natural farming.

Zero Budget Natural farming-(ZBNF):

Zero Budget Natural farming, as the name implies, is a method of farming where the cost of growing and harvesting plants is zero. This means that farmers need not purchase fertilizers and pesticides in order to ensure the healthy growth of crops. **Below are some of the key learnings from the zero Budget Natural farming method.**

ZBNF is a Method of **Chemical-free Organic** drawn from traditional Indian practices. It is believed that plants only received up to 4% of their nutrient requirements from soil; the remaining is absorbed through water and air. The nutrients do not come from soil, using fertilizers is not prudent.

- It is a unique model that relies on Agro-ecology.

- It is a study of natural system in the forestry.

- It aims to bring down the loss of production to nearly Zero and return to a pre-green revolution style of farming.

- It was originally promoted by Agriculture in Subhash-Palekar, who developed. It in mid-1990s as an alternative to the Green revolution

- It claims that there is no need for expenses inputs such as fertilizers, pesticides and Intensive irritation.

Over six years of instance research, he established the following: -

1-   Only dung from local, Indian cows is effective on the soil. Dung from jersey and Holstein cows is not as effective.

2-   Dung and urine of the black colored kapila cow are believed to be the most effective.

3-   To get most of the cow dung and urine, ensure that the dung is a fresh as possible and that the urine is as old as possible.

4-   An acre of land requires 10/kgs of local cow dung per month. Since the average cow gives 11/kgs of dung a day, dung from one cow can help fertilize 30acres of land.

5-   Urine, jaggery & dicot flour can be used as additives.

6-   The lesser milk the cow gives, the more beneficial its dung is towards reviving the soil.

7-   This has given the principal of creating a replacement to fertilizers and pesticides.

More than 40lk farmers across the country have benefited greatly from Palekar's teaching and his method of Natural farming. **ZBNF is based upon the following 4 pillars.**

- Jeevamrutham

- Bijamrita

- Acchadana (Mulching)

- Whapasa

➢   It is mixture of fresh cow dung& aged cow urine,(both jaggery,pulse flour,water & soilto be applied on farmland. **(Jeevamrutham).**

➢   It is a concoction of neem leaves & pulp, tobacco & green chilies prepare for insect & pest management, that can be used to treat seeds. **(Bijamrita).**

➢   It protects to soil during cultivation & does not destroy it by tilling.**(Acchadana).**

➢   It is the condition when they are both air molecules & water molecules present in the soil. There by helping in reducing irritation requirement.**(Whapasa).**

ZBNF method promotes soil aerations, minimize watering, intercropping, bunds &topsoil mulching & discourages Intensive irrigation& deep ploughing. **NSSO**

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data,almost**70%** of Agriculture households spends more than they earn & more than half of all farmers are in Debt.

FINANCIAL OUTLAY:

• The ongoing Organic farming **131** clusters projects proposed to be implemented under **RKVY** with financial Outlay of **Rs.119.24crs.**

• ZBNF new clusters are implemented under **PKVY** during (2017-18) with financial Outlay of **Rs.94.24 crores.**

• The identification of new clusters for the year of (2018-19) is in progress @5 villages per each phase I&II clusters are approved by GOI, Budget is yet to be released by Government of India (GOI).

EXPECTED OUTCOMES:

• Promoting Agriculture Harmony with Nature.

• Reducing the Cost of Cultivation.

• Reducing risks/reducing health hazards.

• Increasing yields, both in the short run and long run.

• Increasing price realization for farmers.

• Enhancing soil fertility&soil biology continuously.

• Promoting biodiversity.

• Enhancing resilience to climate change.

• Healthy food free from chemical residues for all consumers.

• Employment opportunities in villages.

• Improving the quality and quantity of the production.

• Improving the Quality of the Produce.

• Sustainable agriculture for the years to come.

Citing the benefits of the **ZBNF** in **June-2018**, **Andhra Pradesh** rolled out an ambitious plan to become India's first State to practice 100%natural farming by 2024. It suits all in all agro-climatic zones.

- **Finance minister Sri Nirmala Sitharaman** announce that her government will promote ZBNF to reduce cost of production of farmers & they're by double their income. Subash Palekar who coined the word ZBNF by asked by 6-state governments to train their farmers by these techniques. The state of Maharashtra, a considerable number of followers have returned to practicing chemical farming as they failed to improve their incomes with Zero Budget Natural farming (ZBNF).

Note:Forest does not require humans and human assistance for its existence and growth.

IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE (AI) AND ROLE OF CLOUD COMPUTING TECHNOLOGY IN AGRICULTURE FIELD'S. (IOT).

-The Research Foundation was established out of a passion to serve farmers of the nation & national textile industry to be competitiveglobally. Here I remember J.F.kennedy's quote., **"My fellow Americans, ask not what your country can do for you, ask what you can do for your Country".**

Agriculture plays a significant role in the economic sector. The automation in Agriculture is the Main concern and the emerging subject across the world. The population increasing tremendously with this increase Demand of food & employment also increasing. The traditional method which was used by the farmerswere not sufficient enough to full fill these requirements and also provided employment opportunities to billions of people. Artificial intelligence has brought an agricultural revolution.

ARTIFICIAL INTELLIGENCE-(AI): Artificial intelligence in Agriculture such as for irrigation, weeding, spraying with the help of sensors & other means embedded in robots& drones. These techniques save the excess use of water, pesticides, herbicides, maintain the fertility of the soil also helps in the effect use of manpower and elevate the productivity and improve the quality.

Current implementation of automation in Agriculture, the weeding systems through the robots &drones, various soil water sensing methods are discussed along with two automated weeding techniques used by drones for spraying & crop- monitoring is also discussed. The world's population is assumed to be nearly 10billions by 2050.boosting agricultural order in Agriculture of humble financial development.

- **Impact of AI on A's:** the technology which are AI-Based help to improve efficiency in all the field's & also manage the challenges followed by various industries including the various fields in the agriculture seething like Crop yield, irritation, soil content sensing, crop monitoring, weeding, crop establishment. Agriculture robots are built in order to design high valued application of AI in the mentioned sector. With the global population soaring, by Agriculture sector is facing a crisis' food. AI has the potential to deliver much -needed solutions. The average farm is Expected to Generate an average of 4.1 million data points every day. Farmers will be using 75 million connected devices. By 2050.

Artificial intelligence (AI) has contributed in the Agriculture Are as follows:

1: **Image recognition and perception.**

2: Skills and work force.

3: Maximize the output.

4: Catboats for farmers.

- **Robots in Agriculture:** Robots and Autonomous systems (RAS) are introduced in large sectors of the economy with relatively low productivity such as Agri-food.

- These are basically two types.

[Irrigation][Weeding]

     : Dielectric method. **:** Chemical Method

: Neutron Moderation. **:** Pulse-high voltage discharge method

- **Drones in Agriculture**: They work in confluence with the GPS & other sensors mounted on them. Drones are being implemented in Agriculture for crop health monitoring, irritation, equipment monitoring, weed identification, herd and wildlife monitoring & disaster management.

[Crop-Spraying]　　　　　　　　　　**[Crop-Monitoring]**

  : Hydraulic energy sprayer. **:** Yield mapping & monitoring.

  : Gaseous energy sprayer.　　　　　**:** Programming of the software.

  : Centrifugal energy sprayer.　　　　**:** Yield calculation and calibration.

: Kinetic energy sprayer.   **: Processing yield maps.**

- **Challenges & future scope:** Agriculture has been tacking significant difficulties like absence of irrigation system, change in temperature, density of groundwater, food scarcity and wastage and substantially more, less physical control, attraction to hackers, indirect administrative & accountability.

Role of Cloud Computing Technology in Agriculture field's (CCTA):

- **Cloud computing:** Cloud Computing is a kind of internet-based computer. That provides shared processing resources & data to computer and other devices on demand.

- Now a days New ICT technologies are being implemented in every sector of the developing nations and development of focused on the agriculture. The new application domain of ICT is Cloud Computing.

[Cloud Sharing Data /Information]

<Applications> < Platform > < Infrastructure>

- Monitoring	- Object Storage	- Computer
- Collaboration	- Runtime	- Blackstorage
- Finance	- Identity	- Network
- Content	- Data base	
- Communication.	- Queue	

Cloud computing Output Data Devices – Laptop's, phones, Desktops, Tablets.

Computing Model's: 1) Desktop computing. 2) Client server Computing. 3) Cluster Computing. 4)Grid Computing. 5) Cloud Computing.

Data Sharing Workflow: - Agriculture information Technology (AIT-CLOUD)

1. **AIT Cloud (Data/Information)**: AIT Researcher-1

 : AIT Researcher-2

 : AIT Researcher-3

 : AIT Researcher-4

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2.   **Types Of Clouds:**   **Modules of Cloud computing:**

   1-Public Cloud.   - Software as a Service.**(SAAS).**

   2-Private Cloud.   - Platform as a Service.**(PAAS).**

   3-Hybrid Cloud**.**   - Infrastructure as a Service.**(IAAS).**

I)   **Public Cloud**: Cloud Services are accessible in the public domain.Organization and person can Access the resource & data without the involvement of any 3rd party.

II)   **Private Cloud:**Cloud is maintained controlled by the Individual Organizations for his own Use.An Enterprise may decide to implement its own private cloud & maintained by the same Organization**.**

III) Hybrid Cloud: Cloud is mix of public cloud & private cloud more than one enterprise collectively install and maintain their common cloud.

(SAAS): Google Docs,NetSuite,Freshbooks,Gmail,Sales force,Base Camp.

(PAAS):Force Com, Appengine,Azure.

(IAAS):Rack Space Com,Go-Grid,AWS.

Characteristics Cloud computing:

- On demand self-service.
- Broad network access.
- Rapid elasticity.
- Measured services.
- Resource polling

BENEFITS OF CLOUD COMPUTING IN AGRICULTURE OPERATIONS IN FIELDS...?

- Easy Data management.
- Easy and anytime Data Readiness.
- Local and global communications.
- Enhanced the GDP of the nation.

- Improve market prize of food,seeds,other product.

- Motivation to farmers and researchers.

- Reduction of technical issues.

- Improve Economic condition of the Nation by quality products.

- Secure and reliable.

- Reduction of technical issues like manpower&Infrastructure etc.

1.   **Case Study (Con): - Features of Agro-mobile**.-

- Detailed information about Crops & Diseases, causes.

- Learning Services to put questions and get reply spontaneously.

- learning such as audio & video lectures for illiterate farmers of India.

- Act as a real-time question answering service too. No limits of languages.

- Functionalities Provided -Crop advice and analysis, Simultaneous for diseases analysis, weatherforecasting etc.

2. -   **Case Study (Con): AKO Logic**:Software for Food Security & Food safety.

"AKOLogic"-1st Agricultural Cloud in the worldbased on Microsoft Cloud "**Azure".** Using a **SAAS – (Software as a Service Model)**. Monitoring and control system we can active. "Food safety,Food ", plant protection, efficiency, Innovation, transparency & information sharing.

3-   **Case study(Con):** (Cloud Computing to control Automatic-Irrigation systems). System uses an Ethernet Module to provide the microcontroller interface for internet connection. The module has been mapped cloud connector allows to us to integrate our MCU (Micro Controller unit). Platform with cloud.

4-   **Land Record Automation:** Cloud Computing storage facility store the record of land with the description related to that land like soil analysis result and production historyetc**.**