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SOUVENIR

ICFAI
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JHARKHAND

*IN
ASSOCIATION
WITH*



ORGANISES

NATIONAL CONFERENCE

ENHANCING FARMER'S INCOME THROUGH
NATURAL FARMING: CHALLENGES AND
OPPORTUNITIES

*16th & 17th February, 2023
Thursday & Friday*



Venue

ICFAI University Jharkhand Campus
Plot # 2065, Simalia
Near Daladali Chowk
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Phone No: 7257004504

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NATIONAL CONFERENCE on "ENHANCING FARMER'S INCOME THROUGH NATURAL FARMING: CHALLENGES AND OPPORTUNITIES" ON 16TH & 17TH FEBRUARY 2023

NATIONAL CONFERENCE

On

"ENHANCING FARMER'S INCOME THROUGH
NATURAL FARMING: CHALLENGES AND
OPPORTUNITIES"

Organized By

The ICFAI University Jharkhand Ranchi

*16th & 17th February, 2023
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About ICFAI University Jharkhand

About Us

The ICFAI University, Jharkhand (IUJ) was established under the provision of the Institute of Chartered Financial Analysts of India University Act, 2006 (Jharkhand Act No. 08 of 2007), vide Notification dated June 17, 2008 of the Government of Jharkhand. The University is sponsored by the Institute of Chartered Financial Analysts of India (ICFAI), a not-for-profit educational society established in 1984 under the Andhra Pradesh (Telangana Area) Public Societies Registration Act, 1350 F (Act No. 1 of 1350 F) with the objective of imparting training in finance and management to students, working executives and professionals in India. The IUJ is included in the list of universities maintained by University Grants Commission (UGC) under section 2(f) of the UGC Act, 1956 vide their letter no F.8-17/2009(CPP-I) dated 01 Dec 2009. The ICFAI University, Jharkhand (IUJ) is a part of ICFAI Group that is well known for its quality of education and ethics. It is the first Private University that was set up in Jharkhand, as per the State Legislative Act and is recognized by UGC, as per Section 2(f) of UGC Act, 1956. The University offers a range of Under-Graduate, Post-Graduate and Doctoral Programs in Engineering, IT, Law and Management disciplines.

The University believes in creating and disseminating knowledge and skills in core and frontier areas through innovative educational programs, research, consulting and publishing, and developing a new cadre of professionals with a high level of competence and deep sense of ethics and commitment to the code of professional conduct. The University is committed to grooming its students into competent professionals, by providing contemporary knowledge, equipping them with industry-relevant skills and inculcating good values. The University was ranked among the top ten in East Zone and among top 50 in the Country during 2020, as per various independent rating and ranking agencies.

Faculties of the IUJ

The IUJ has two faculties: i) Faculty of Management Studies (FMS) and ii) Faculty of Science & Technology (FST). While FMS is committed to provide quality education and training along with research in the field of management by helping the students to develop business and personal competence through their exposure to real business problems, case-based analysis and industrial interaction, FST is devoted to offer advanced industry-oriented education in the field of technology.

FMS offers:

- **MBA** (Masters of Business Administration), a two year campus based program for graduate students.
- **MBA-WP** (Masters of Business Administration for Working Professionals), a two year campus based program for working graduates.
- **MCA** - is a three year campus-based program for **Graduate (10+2+3)** students in any discipline.
- **BBA** (Bachelor of Business Administration), a three year campus based program for 12th Class (any Group) pass students.
- **BCA** (Bachelor of Computer Application), a three year campus based program for 12th Class (any Group) pass students.
- **B. Com. Honours** in Banking/ Financial Services/ Insurance, Accountancy and Computer Application, a three year campus based degree program for 12th Class (any Group) pass students.
- **B.SC (Physical Science)** is a three year Campus based program offered with a view to impart in depth knowledge and broad understanding of Physical Sciences- Mathematics, Physics and Chemistry.
- **BBA-LL.B (Hons)** Program is a 5 year full-time program, offered with the outlook of imparting a thorough and deep knowledge of the law courses to the students.
- **LL.B Program**: The LL.B Program is a 3 year full-time program, approved by the Bar Council of India (BCI) for graduation pass students.
- **Ph.D. Program** (Part-Time) in Management, for the working executives and academicians with 2 years Post-graduation and work experience of three years. It is compliant with UGC Regulations.

FST offers:

- **B.Tech.**, a four year campus based degree program for the students of Class 10+2 Science (PCM group) offered in Computer Science & Engineering (CSE), Data Sciences and AI (DS&AI), Mechanical Engineering (ME) and Mining Engineering (MN).
- **B.Tech. (Lateral Entry)**, a three year degree, campus based degree program for the students in respective branch of Engineering with minimum 50% marks offered in Computer Science & Engineering (CSE), Data Sciences and AI (DS&AI), Mechanical Engineering (ME) and Mining Engineering (MN).
- **DIT**: The Diploma in Technology (Polytechnic) Program is a three year, six-semester, full-time, campus-based program, offered in Computer Science & Engineering (CSE), Mechanical Engineering (ME) and Mining Engineering (MN).

MESSAGE FROM THE HON'BLE CHIEF MINISTER



HEMANT SOREN
CHIEF MINISTER

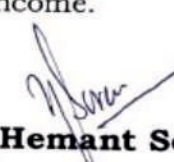


MESSAGE

I am delighted to know that ICFAI University in association with NABARD is organizing National Seminar on the theme "**Enhancing Farmer's income through Natural Farming: Challenges and Opportunities**".

The theme selected for the seminar is quite relevant as new ideas and suggestions would be debated and would certainly result in new vistas of increasing farmer's income.

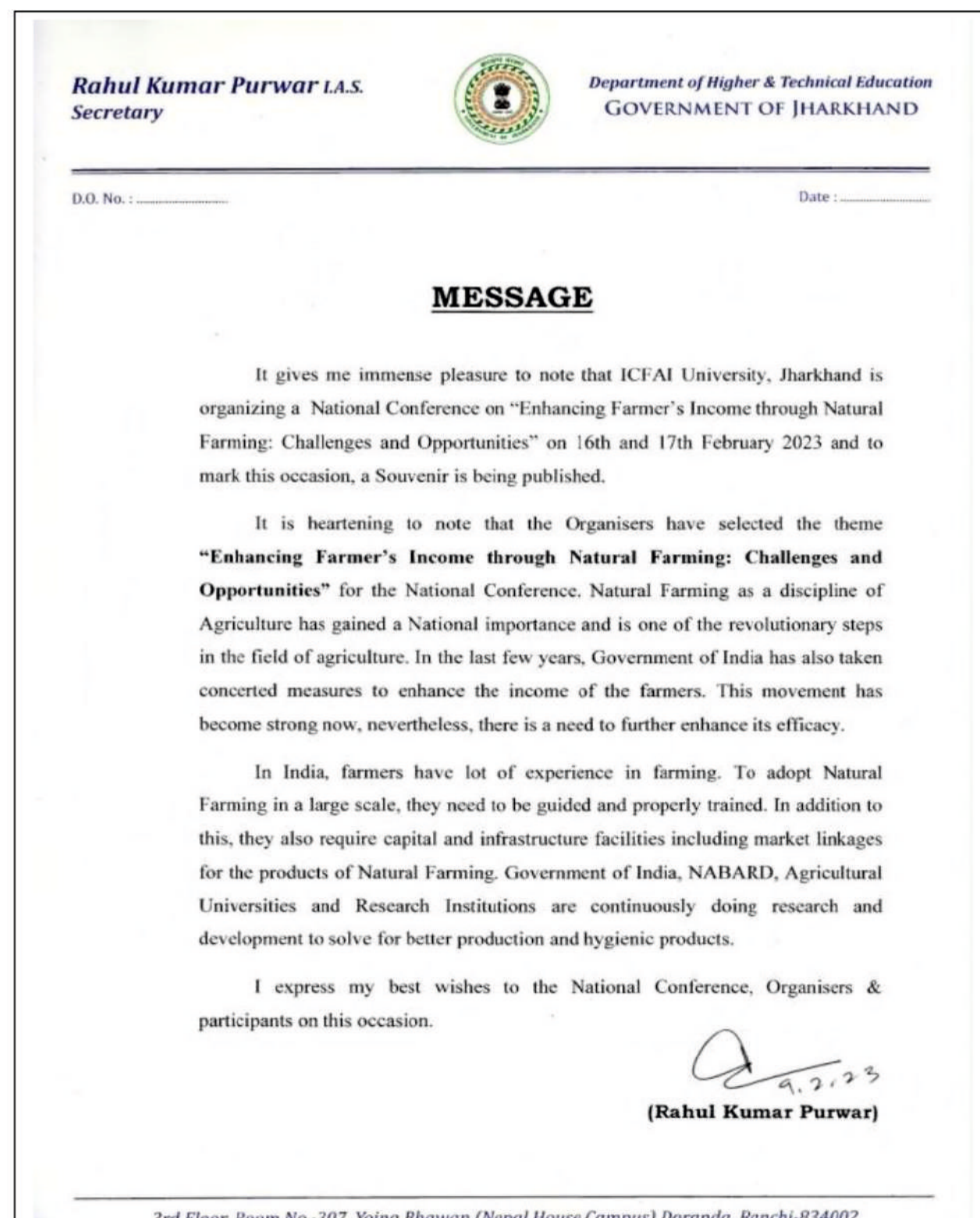
I wish the seminar a grand success.


(Hemant Soren)



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MESSAGE FROM THE DEPARTMENT OF HIGHER & TECHNICAL EDUCATION



ROLE OF WOMEN IN NATURAL FARMING IN INDIA

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India is developing country. As per the 2011 census, approximately 33.7% of rural males migrate in search of employment and better economic opportunities. The increasing migration of rural men has led to the feminization of the agriculture sector, with the participation of women in agriculture and allied activities becoming more significant. The main occupation is agriculture, because 70 per cent of the population is involved in this occupation. This paper finds that agriculture creates many jobs for women in agriculture sector. Jobs that bring many household resources under women control leads to greater earnings in the family. Women have historically been involved in labour-intensive agricultural activities. They have played a key role in biodiversity management and sustainable agriculture through ecological practises, such as conserving traditional seeds, preparing natural fertiliser, and using diverse natural resources to meet daily household needs. Women's Participation in Natural Farming Initiatives can help them to boost their incomes and their involvement in decision-making. It would also positively impact the health and nutritional status of the family. While, women are more than ever finally employed, differences in wages earned by women and men persist in India. Due to these reasons and women's lower education level compel the women have a greater tendency to remain in subsistence agriculture. The impact of liberalization and globalization on women is important not only because they represent almost half of the total population, but also because they face constraints, which make them less beneficial from the liberalization. Once different impacts are ascertained well designed policy responses may aid women in taking advantage of greater openness to agriculture."

Key words: Women, agriculture, employment, natural farming.

AWARENESS IN NATURAL FARMING IN INDIA

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Farmers are seen as the backbone of the rural economy. Since Independence, various policies have been rolled out concerning the farmers and the status of our agrarian economy.

Understanding the perception and awareness of farmers and other local stakeholders remains a challenge for the adoption of agricultural sustainability. It plays a key role in protecting the environment and preserving landscapes and biodiversity loss due conventional agriculture system. It also endeavours to ascertain their satisfaction and opinion on the schemes and programmes initiated by Government of India (GoI) to promote ecological agricultural practices. Variations in agricultural perceptions can be attributed to differences in education, farming experience, environment, and culture. Insufficient information, lack of organized training centres, and poor environmental education provisions were some of the constraints in improving environmental knowledge and behaviour of farmers. Cognitive mapping identifies key factors within agricultural belief systems which can aid research agencies in developing a greater understanding of community perception of farming system. Improving farmers' environmental awareness is vital for conservation of India's remaining natural resources and biodiversity. Therefore, all international, national, and local stakeholders must work jointly to improve the environmental behaviour of farmers.

Keywords: Awareness, Natural Farming, Stake holders, Implementation

MESSAGE FROM CGM, NABARD



Message

It gives me immense pleasure to know that ICFAI University, Jharkhand is organizing a National Conference on the theme "Enhancing Farmer's Income through Natural Farming: Challenges and Opportunities" on 16th & 17th February 2023 and publishing a souvenir on this occasion.

In India, Natural Farming is at nascent stage and require not only technical handholding support but also adequate capital and infrastructure facilities including market linkages for the by-products of Natural Farming. Various research institutions are currently conducting the research to assess results of natural farming. Some research is based on field experiments, while others are based on surveys with practicing farmers.

NABARD has recently launched an agroecology-based programme **JIVA** that will promote natural farming under its existing watershed and wadi programmes. "JIVA is a culmination of several projects under the watershed programme and will be implemented on our existing completed (or near completed) watersheds and wadis in 11 states including Jharkhand covering five agroecological zones, which are in ecologically fragile and rain-fed areas.

I hope that this national seminar will provide a platform to all the major stakeholders such as academicians, agricultural industrialists and policymakers to gain perspectives and share learnings and experiences, which will go a long way in providing a systematic direction towards an equitable and inclusive environment for future growth.

श्रीनिवास

(Dr. M S Rao)

Chief General Manager
Jharkhand Regional Office, Ranchi

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MESSAGE FROM THE VICE-CHANCELLOR



PROF. O.R. S RAO

Institute of Chartered Financial Analysts of India University, Jharkhand
Established under the provisions of the Institute of Chartered Financial Analysts of India University Act, 2006 (Jharkhand Act No. 08 of 2007)

Prof. O R S Rao
Vice-Chancellor

Dt. February 13, 2023

MESSAGE

Natural Farming (Bhartiya Prakratik Krishi Paddhati (BPKP)) is a chemical-free farming system, based on livestock and locally available resources and is rooted in Indian ancient traditions.

As it reduces the cost of cultivation, farmer's income can be enhanced substantially. It is beneficial for the consumers, as it provides chemical-free nutritious food. Natural Farming also protects environment by way of water conservation and renovation of soil. Besides, it integrates crops, trees and livestock, enabling the optimum use of functional biodiversity.

Government of India, in association with NABARD and the State Governments, has been promoting Natural Farming since 2019, through a number of initiatives. So far, over 10 Lakh hectares are covered under Natural Farming, in 15 states, wherein over 16.76 lakh farmers are involved. Success stories across the country have emerged for various crops like Rice, wheat, jowar, sugar cane, fruits etc. also, demonstrating tangible benefits over chemical farming.

Natural Farming will be the future of Farming in India. However, there are a number of challenges to scale up Natural Farming, in a big way, across all the states of India.

It is in this context, our University, in association with NABARD, is conducting this National Seminar on "Enhancing Farmers' Incomes thru Natural Farming – Challenges and Opportunities".

I am confident that it will be an excellent platform for all the concerned stakeholders- academicians, researchers, industry managers, agri-financing agencies, consultants, policy makers etc – to share their experiences, discuss various issues and come up with a road-map for the future.

I wish the seminar a grand success.


Prof O R S Rao
(Vice-Chancellor)
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FARMERS PERCEPTION OF TOWARDS ORGANIC FARMING

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Organic farming is gaining popularity all over the world as it has the potential to diversify agricultural production methods, boost productivity, farm income, and food output, as well as improve environmental safety. Sustainable development has influenced people's thoughts and behaviour worldwide for more than ten years. Sustainable agriculture is essential for sustainable development. Organic farming is one of the numerous strategies employed to realise the objectives of sustainable agriculture.

Numerous methods employed in organic farming, such as intercropping, mulching, and combining crops and livestock, are not new to other agricultural systems, including the traditional agriculture used in ancient nations like India. The biggest concern of food policy-makers around the world has always been how to produce enough food to meet the needs of a growing population.

The paper's main goal was to assess how farmers felt about organic farming and the problems related to it. The current research was carried out in Ranchi, Jharkhand. Chi-square analysis was employed to assess the study hypotheses, while descriptive statistics and factor analysis were utilised to describe the study's findings.

Key Words: - Organic Farming, Production, Perception, Productivity, Agriculture.

ADOPTION OF NATURAL FARMING IN THE STATE: NEED PESTLE APPROACH

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Natural farming is an innovative approach in Indian Farming. The success of its adoption depends upon the practice and perceptions of various stakeholders. The government with the help of regulatory agencies, allied research institutes and other multi-lateral agencies is encouraging this farming for the farmers. NITI Aayog is also made a road map for Natural farming. Various researchers have studied its adoption and success in few states. Based upon this gap, the present study focuses on the Macro approach in each implementing state by the way of PESTLE approach. PESTLE is a strategic framework of Political, Economic, Social, Technological, Legal and Environmental analysis. It assesses the impact of external factors on the implementation of any farming approach. The major objective was to know the PESTLE factors for adoption of Natural Farming in the state. The data was collected from secondary sources. To analyze the data, Systematic Literature review was used from the year 2010 to 2022. According to the findings, positive political force from Government, parastatal and special groups are critical which is lacking in many states. Trends in the Agriculture practices in the long run and its structural, seasonal, cyclical issues, economic condition of the farmers and the state need to be properly considered under economic factors. Preference of farmers, Agricultural officers, Scientists in the locality towards organic or natural farming is another area of concern considering the social factors. While integration of technology and legal aspects are the facilitators to the Natural Farming, Pollution and Other environmental situations are also equally to be addressed. The research has implication on the implementing agencies in the state and centre towards Natural Farming. Future study can be carried out with the help of SWOT analysis and Porters Five forces model to understand better in the Macro Environment.

Key Words: *Natural Farming, Political, Economic, Social, Technological, Legal and Environmental*

Acknowledgement

ICFAI University Jharkhand is thankful for the financial assistance received from Research and Development Fund of NABARD towards printing of Souvenir cum Seminar Proceedings for the *National Conference* on "*Enhancing Farmer's Income through Natural Farming: Challenges and Opportunities*". Our University is thankful to all the research scholars, Industry Experts, Institution faculty, and academicians for their contribution of technical papers /Case studies for the National Conference on *16th & 17th February, 2023*.

About the Seminar

About the Conference: Natural Farming is one of the revolutionary steps in the field of agriculture. It is the chemical free traditional farming method. The farmers undergo indigenous practices and encourage using local breeds of seeds, and native varieties of vegetables, grains, pulses and other crops. In order to promote among the farmers, a lot of emphasis has been given by Government and other multi-lateral agencies. Also, on 16th December 2021, Hon'ble Prime Minister, Shri Narendra Modi at the National Conclave on Natural Farming in Gujarat has emphasized its importance. The movement among the Government machinery has become strong and in fact, there is a need to further enhance its efficacy.

In India, the Marginal, Small and Medium farmers are the instrumental for the agricultural productions and withstand the vagaries of nature. They engage themselves to increase their production and to encounter the market forces by optimizing the critical factors of production. The farmers are bound to apply various chemical fertilizers, pesticides to boost the agricultural production, which is not a good sign for long term. States like Andhra Pradesh (12.30% of farmers covered), Himachal Pradesh (16% of the farmers Covered) and Gujarat (3.76% of the farmers covered) are the front runners in Natural Farming.

Majority of these Farmers are in the nascent stage of Natural Farming and require not only technical handholding support but also adequate capital and infrastructure facilities including market linkages for the products of Natural Farming. The report of NITI Aayog predicts that the population in the world will reach to approximately 10 billion by the year 2050 and the demand for food grain will also increase substantially up to 50 %. Depletion of ground water is also another area of concern which is a challenge to the modern Agriculture. Government of India, NABARD and Various Agricultural Universities and Research stations are continuously doing research and development to solve for better production and hygienic products. While these initiatives present excellent opportunities for inclusive Natural Farming

THE IMPACT OF AGRI-SUPPLY CHAIN MANAGEMENT IN INDIA

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Agribusiness, supply chain management (SCM) implies managing the relationships between the businesses responsible for the efficient production and supply of products from the farm level to the consumers to meet consumers' requirements reliably in terms of quantity, quality and price. In practice, this often includes the management of both horizontal and vertical alliances and the relationships and processes between firms. Agri-supply chains are economic systems which distribute benefits and a portion of risks among participants. Thus, supply chains enforce internal mechanisms and develop chain wide incentives for assuring the timely performance of production and delivery commitments. They are linked and interconnected by virtue of shared information and reciprocal scheduling, product quality assurances and transaction volume commitments. Process linkages add value to agricultural products and require individual participants to co- ordinate their activities as a continuous improvement process. Costs incurred in one link in the chain are determined in significant measure by actions taken or not taken at other links in the chain. Extensive pre-planning and co-ordination are required up and down the entire chain to affect key control processes such as forecasting, purchase scheduling, production and processing programming, sales promotion, and new market and product launches etc. Following are the components of an organized agri- supply chain. Because of its quick turnaround time, India became the favored business location during and after the Covid-19 pandemic. As firms attempted to repair their damaged value chains in difficult times and reduce long-term supply chain risks, India was an alternative choice to fill the distribution network and vast domestic market with expanding disposable incomes. These elements are combined with the comparative void, since it is a stable nation with safe investment conditions. The country's claim is strengthened by its diverse corporate environment; skilled, inexpensive labor readily available in the market will also contribute to the country's emergence as an international commercial hub.

Keywords: *Supply chain management; product quality assurances; domestic market; economic systems*

LEVERAGING DIGITAL TECHNOLOGIES FOR ACHIEVING SUSTAINABLE AGRICULTURE

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Digitalization has made it possible for agriculture to undergo a significant revolution. Understanding agricultural science and enhancing agronomic techniques to provide better results are key components of digital farming which is paving way for smart agriculture. With the help of digitalization, the producers can control supply and demand and can also move towards embracing the finest practices for a sustainable future. This paper will highlight how the decision-makers can gain actionable insights into agriculture-related issues and can make real-time monitoring of agricultural productivity through satellite. With the help of digital tools, farmers are enabled to take accurate, effective decisions which can improve their agricultural production. The introduction of digital tools gives them the ability to deal with operational difficulties, and address climate change and other environmental issues with the use of scientific information.

The R&D and current technologies also strengthened the accessibility of extensive data from various levels of food production and distribution. In recent times, with the digitalization there is scope to increase resource and agricultural production and moreover, the food producers now have access to automation tools and data management solutions. The paper has attempt to explain as how the utilizing agri-technology increases farm output and lowers costs, the farms that have embraced technological advancements have shown a clear transition replacing time-consuming procedures with modernized, cost-effective operations. As a result, it improves farmer income through proper understanding of agricultural science and enhancing agronomic techniques. Additionally, digital technologies can creatively bridge producers and consumers by providing updated business information.

The paper has discussed as how beyond farming, digital technologies are essential for enhancing access to services, decreasing issues connected to remoteness, and making rural communities more appealing, intelligent, and sustainable. Yet another advantage of digitalization in agriculture specifically supporting the smallholder farmers in overcoming some of their difficulties, such as current commodity pricing and other crucial market information, a lack of skills to bargain for payment, and a lack of access to other purchasers in the market. Additionally, farmers can know market demands and modify crop production with the help of intelligence gathered at numerous points throughout the supply chain. The paper will bring insights for effective policy creation and execution from the part of Governmental organizations to establish effective single database with all the information about farmers in every state or the entire nation.

Keywords: *Digitalization, technologies, agronomic, farming, sustainable*

for the growth of the farmers and the country, as a whole, there are a number of challenges to be addressed.

It is in this context, ICFAI University, Jharkhand, in association with NABARD, Ranchi is organizing this National Conference, which will provide a platform for discussion on the various facets of the Natural Farming, by academicians, researchers, industry professionals, agro entrepreneurs, scientists from agribusiness and related sectors, agri-financing and refinancing organizations, Non-Government Organizations, policy makers from Central and State Government so as to make Farmers and supporting intermediaries such as SHGs, FPOs/FPCs and other entity more robust for better production and rural upliftment.



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Objectives

This conference is aimed at examining, analyzing and presenting different ideas on renovation and revival of prospects of natural Farming and various challenges associated with it in case of Indian Farming. Broad Themes/Sub themes of the Conference

Professional managers, technical experts, management consultants, academicians, researchers, industry professionals etc. are expected to participate with their lead papers. Besides, it offers a Networking Platform for Researchers (both budding and experienced), to share their thoughts and experiences for mutual benefit.



NATURAL FARMING: A STEP TOWARDS SUSTAINABILITY

ANJALI KUMARI

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Natural farming is the method of farming in which farmers does not use any type of fertilizer like organic or chemical both are restrain from use. It is largely based on crops, trees and livestock waste allowing the optimum use of functional biodiversity. In India it is known by various name like Zero Budget Natural Farming, Prakritik Krishi, cow based natural farming, etc. Government of India is promoting natural farming through a scheme named bhartiya prakriti krishi paddhati (BPKP).

Natural farming aims to increase farmer's net income through viable and inspirational farming on account of reduction in cost & risk and intercropping as well due to this cost effective practice it is raising employment in rural areas and ensuring rural development. It also provides better health benefit because of no use of any synthetic chemical in the farming hence offers us high nutrition density food and also eliminate health risk that caused by synthetic chemical farming.

Natural farming helps to rejuvenate the soil health and water usage in this is more judicious due to which it provides much lesser carbon and nitrogen footprints. It also helps in sustainability of livestock like using cow dung and urine for the production of natural products such as jeevamrit, beejamrit, etc.

The world population is growing rapidly and estimated to touch 10 billion by 2050. So it is very necessary to increase the natural farming to ensure sustainable development and providing chemical free healthy food to feed the large population. Governments and farmers have to join hands to make this natural farming cover large area of our globe. Only then we can truly ensure Environment and Human co-existence.

Keyword: *Natural farming, Sustainable development, chemical free farming*

A STUDY ON THE FINANCIAL INITIATIVES IMPLEMENTED IN INDIA TO PROMOTE RURAL FINANCE THROUGH NABARD

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Agriculture is the backbone of the Indian economy, and the villages are where the real India is. The goals of economic planning cannot be achieved without rural economic growth. Therefore, it is believed that banks and other financial institutions play a crucial role in the growth of India's rural economy. The NABARD is essential to the economic growth of rural India. A developing nation like India should be the perfect setting for microfinance programmes looking to reach the underprivileged and achieve financial sustainability. Microfinance is viewed as a key technique for reducing poverty and a way to spur economic expansion and employment among small, micro, and medium-sized businesses (SMME). In order to promote a successful sector, a sophisticated set of best practice models, a network of active members, coordinated support for rural citizens, and the active support of banks and NABARD in India have all arisen. Farmers have access to bank credit through short-term loans for the production of agricultural goods as well as financial programmes like medium- and long-term debt financing for capital investments in agriculture and related fields like land, land purchases, minor irrigation, farm mechanization, programme development, domestic poultry animals, fishing, plantations, and horticulture. The National Bank for Agriculture and Rural Development also provides these institutions with long-term and short-term finance, which is accessible for the storage, processing, and sale of agricultural products that are needed today (NABARD). It represents a development in agricultural finance. In this essay, an effort has been made to comprehend the idea of rural finance in India, the function of NABARD in the credit sector's priorities, as well as the many NABARD-initiated projects for the sustained growth of rural India. The study may reveal the advantages and disadvantages of rural finance in India.

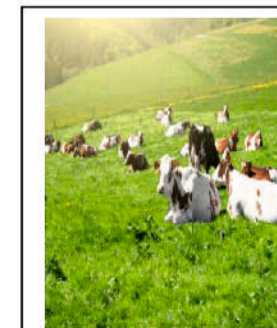
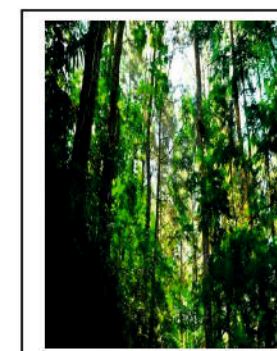
Keywords: NABARD; SMME; Indian economy; Microfinance; Rural Economy

THEMES OF THE NATIONAL CONFERENCE

THEME: NATURAL FARMING

SUB-THEMES:

- ❖ Soil Management
- ❖ Agri Based Congenial ecosystem
- ❖ Plant Protection Management
- ❖ Crop diversification and Management
- ❖ Management of Natural Resources
- ❖ Water Conservation and Management
- ❖ Sustainable Farming
- ❖ Livestock Management
- ❖ Climate change and sustainable Agriculture
- ❖ Self-Employment and Agri-Entrepreneurship.
- ❖ Agricultural Research for developed Farming
- ❖ Institutional Credit



THEME: MANAGEMENT PRACTICES

SUB-THEMES:

- ❖ Awareness for Natural Farming.
- ❖ Cost effective farming Practices
- ❖ Marketing of Green Products
- ❖ Enhancing farmers' income through proper HRM Practices
- ❖ Value addition and Post-Harvest Management.
- ❖ Role of Women in Natural Farming.
- ❖ Supply Chain Management and Farming.
- ❖ Socio-Economic Environment in Farming
- ❖ Political- legal efforts in boosting Farming



THEME: FARM MECHANIZATION AND TECHNOLOGY ADOPTION

SUB-THEMES:

- ❖ Pivotal role of Technology in Strengthening Natural Farming
- ❖ Support and promotion by Government and other agencies
- ❖ Digital Transformation in Agriculture
- ❖ Improved agri implements and Farm mechanization
- ❖ AI, IOT, GIS and Remote sensing in Natural Farming
- ❖ Government reforms and Schemes



BUDGET 2023: A STEP AHEAD TO BOOST NATURAL FARMING

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Natural agriculture in India is growing rapidly in recent years as consumers become more aware of the benefits of eating healthy and chemically balanced foods. Natural farming also has the immense potential to improve the livelihoods of farmers in India. Union Finance Minister Mrs. Nirmala Sitharaman in Union Budget 2023-24 announced that the government will help 1 million farmers transition to natural (or chemically balanced) agriculture over the next three years. The Budget further highlighted that it would launch the PM Program for Land Restoration, Awareness and Enhancement (PM PRANAM) to provide incentives to States and United Territories to promote the balanced use of alternative and chemical fertilizers. The central government has announced to set up 10,000 Bio Input Resource Centres for the farmers. The PM PRANAM scheme Launched under the green growth targets is designed as a programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth. The scheme will incentivise the states and union territories to promote alternative fertilisers and ensure balanced use of chemical fertilisers.

The Centre has tried to ensure that the small and marginal farmers are not left out in the process. It lays much emphasis on promoting the modernisation of the agriculture sector also by linking it with technology so that farmers get comprehensive benefits in the long run and making it sustainable.

Key Words: Budget, PM PRANAM, Natural Farming

AWARENESS FOR THE NATURAL FARMING

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Natural farming is the farming system which does not involve any external or organic fertilizers. It is also known as "Do Nothing Farming." This farming is inspired by the book of "The One Straw Revolution" which was written by Masanobu Fukuoka. From this farmers and experts came up with the innovative ideas to farm without the use of chemicals. The Natural farming includes all the natural process such as everything is upon the weather and the process is slow as everything is done and grown by natural process. Instead of fertilizer and pesticides, cow dungs and manures from organic matter are used. Several studies have reported the effectiveness of natural farming in terms of increase in production sustainability, saving of water use, in soil health and farmland of ecosystem. It is also considered as a cost effective farming practices with a scope for raising employment and rural development. If Natural farming is practiced it can also help in reducing health problems which are caused because of the chemicals used for the rapid and bulky production of crops with having fewer amounts of nutrients in it also leaving residue of the chemicals in it. Also the chemicals used in the production leaves a very good amount of chemicals and fertilizers residue preventing the production of earthworms and making it less fertile.

Natural farming comes with various benefits for the farmers as well for the environment such as; it reduces the cost of cultivation as everything is dependent upon the climate and the natural process. Farmers save themselves from buying expensive fertilizers and pesticides. It also Provide safe and healthy food for the people. It also reduces the water requirement of crops from the land. Also making the land fertile by using no chemicals.

There are many promoters of Natural Farming through their scheme such as Bharatiya prakriti Krisi Padhti(BPKP), Paramparagat Krisi Vikash Yojana(PKVY), Namami Ganga and Large Area Certification(LAC). In India, Natural Farming is also referred as "Rishi Kheti" which is based on an ancient Vedic principle of farming like the use of animal waste and herbal juices for controlling pests and promoting the growth of plants.

Key Words - *Organic matter, soil improvement, increasing production, chemical free, fertility*

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COST EFFECTIVE FARMING PRACTICES.

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India is considered as an agricultural country as agriculture is the backbone of the Indian economy. Agriculture is termed as the main source of income for the Indians and is hence the oldest activity performed for livelihood. India consists of various landforms and soil types which results in varieties of farming practices. Despite of having a rich content of soil and various landforms, India not only believes in production but also making the production cost effective. The country focuses on making the farming practices cost effective benefitting the farmers with less or reduced cultivation costs, higher income and profit maximization.

Organic farming is regarded as the most cost effective farming as it reduces the input cost and brings out or generates the maximum output. It basically speaks of lowering the use of chemical fertilizers and other chemical substances. It mentions of upgrading the use of natural methods such as crop rotation, crop residues, animal manure, off farm organic waste, etc. This type of farming utilizes the substances produced by the nature and its beings. The waste produced while cutting the fruits and the vegetables and the waste produced by the animals such as cow dung and others are a source of great natural fertilizers. It helps in obtaining a chemical free farming and a natural environment. The Government has also been promoting various schemes to help the farmers acknowledge the importance of natural farming making the cultivation and production cost effective. Some of these schemes are Paramparagat Krishi Vikas Yojana (PKVY), Mission Organic Value Chain Development for North Eastern Region (MOVCDNER) , Capital Investment Subsidy Scheme (CISS) under Soil Health Management Scheme , National Mission on Oilseeds and Oil Palm (NMOOP) , National Food Security Mission (NFSM) , etc.

Sikkim is India's first fully organic state in 2016. It is implementing organic practices on almost 75000 hectares of agricultural land. It is not only the first fully organic state of India but also in the world. Sikkim had a resolution in 2003, to shift towards Organic Farming with an aim to stop usage of chemicals and pesticides in farming. India ranks at 4th place in terms of certified area globally as per the report published by Research Institute of Organic Agriculture (FiBL) and the International Federation of Organic Agriculture Movements (IFOAM) Statistics 2022.

Keywords: *Cost effective, organic farming, agriculture, chemical, farming practices.*

EFFECT OF MANURE IN COMBINATION WITH BIO-FERTILIZER ON YIELD AND QUALITY OF SUGARCANE PLANT-RATOON SYSTEM IN CALCIORTHENT UNDER NATURAL FARMING SYSTEM

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A field experiment was carried out to develop nutrient management strategies for sustaining soil health, quality and sugarcane production for two consecutive seasons on spring sugarcane plant-ratoon system at Crop Research Farm, Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar. Field trials were conducted to test the efficiency of various fertilizers in sugarcane on solubility of applied inorganic fertilizer during spring sugarcane plant-ratoon system in calcareous soil. The pooled data revealed that number of millable cane (NMC), cane yield, and sugar yield varied significantly due to integrated use of organic and inorganic fertilizer with bio-fertilizer in combination both in plant and ratoon crops. The significant increase in number of millable cane, cane yield and sugar yield was recorded in the treatments receiving organic and inorganic fertilizer in combination with bio-fertilizer over control both in plant and ratoon crops. The pooled data for NMC ($69.0 \times 10^3/\text{ha}$ - $93.0 \times 10^3/\text{ha}$), cane yield (53.8 - 81.7 t ha^{-1}) and sugar yield (6.28 - 10.18 t ha^{-1}) varied significantly. The highest number of NMC ($93.0 \times 10^3 \text{ ha}^{-1}$), cane yield (81.7 t ha^{-1}) and sugar yield (10.18 t ha^{-1}) was recorded in treatment receiving 50% N + 50% P + 50% K + *Trichoderma* + PSB + *Azotobacter* along-with Bio-compost @ 5 t ha^{-1} . The residual effect of treatment receiving organic and inorganic fertilizer in combination with bio-fertilizer was also pronounced on NMC ($88.1 \times 10^3 \text{ ha}^{-1}$), yield (77.5 t ha^{-1}) and sugar yield (9.28 t ha^{-1}). The organic sources in terms of bio-compost improved performance of sugarcane. The uptake of nutrients (NPK) by plant and ratoon followed the similar trend as cane yield. The treatment receiving RDF along with various biofertilizer significantly improved productivity of sugarcane over control (RDF). However, the efficiency of Bio-fertilizer was more pronounced under inorganic treated plots. The reduction in pH and increase in EC, organic carbon and available nutrients (N, P and K) in post-harvest soil was recorded in treatment receiving organics through bio-compost. The result clearly indicated that integrated use of bio-compost along with various bio-fertilizer improved fertility status of soil with improvement in population of microbes.

Key words: Bio-Compost, PSB, Nutrient Uptake, Sugarcane.

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ECONOMIC INFLUENCE OF NATURAL FARMING IN JHARKHAND

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Agriculture and allied activities play a key role in the economy of Jharkhand. A large part of the population in this state lives in villages and depends on agriculture activities for their food, lively hood, employment, and income. This important sector of Jharkhand has many issues like supply of proper good quality seed, high dependency on monsoon as irrigation facility is still developing, low productivity and poor marketing facility etc.

With conventional method of cultivation now a day's natural farming is also getting farmers' attention in Jharkhand. But the major problems of natural farming are marketing & transport for which most of the farmers are forced to sell their produce at low cost and therefore unable to get more profit from their quality products. Many popular organic food brands like Pro Nature are developed because of high consumer demand. The corporate takeover of organic food is further encouraged by major retail chains like Wal-Mart have expanded their private label in organic food sales. Corporate owned organic brands can push down the prices of organic products because they're willing to cut corners in the production process and pay farmers less. Some cut costs by confining dairy cows most of the year and otherwise sacrificing animal welfare, which allows them to sell their "organic" milk at prices that small organic farm with higher standards can't match. However, the fact that large corporations have involved themselves in organic food production by natural farming is not all bad. As they sell more organic food, more acres of land are protected from chemical pesticides and fertilizers, thus helping the environment and the soil in which our food is grown. Additionally, mass produced organic products have significantly raised awareness among consumers. Buying organic products is an important step in the learning process necessary to create a more sustainable food system.

Natural faming has gained international recognition with greater consumer's interest for organic food and farmers are responding to it favourably. The natural faming helps to achieve greater ecological and economical sustainability of Indian agriculture.

Keywords – *Corporate Takeover, "Organic" Milk, Pronature, Wal-Mart.*

AWAKENING PEOPLE FOR NATURAL FARMING

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Raising awareness for natural farming is essential in order to encourage more people to adopt these practices. Natural farming is a sustainable form of agriculture that relies on natural inputs such as the use of compost and natural pest control methods to produce safe and healthy produce. It is a more eco-friendly and cost-effective form of farming compared to traditional methods, and it can help to reduce the carbon footprint of the agricultural industry.

One way to raise awareness for natural farming is through the use of digital marketing and communication platforms such as social media. Farmers can use these platforms to share their stories and showcase their products, which help to spread the word about natural farming. Additionally, traditional forms of communication such as print and television can be used to promote natural farming practices. Holding seminars and workshops is also a great way to educate people about natural farming and how they can support it. Partnering with educational institutions is also a great way to raise awareness for natural farming. Schools, Universities, and other educational institutions can use their networks to share information about natural farming methods and promote sustainable farming practices. Additionally, research institutions can help to advance the knowledge about natural farming techniques, as well as provide valuable data that can improve these practices. Joining forces with other organizations is also helpful in raising awareness for natural farming. Organizations such as NGOs and non-profits can help to spread the word about natural farming and advocate for sustainable farming practices. Additionally, government initiatives can help to promote natural farming through subsidies and support programs. Overall, raising awareness for natural farming is essential in order to encourage more people to adopt these practices. By leveraging digital marketing platforms, partnering with educational institutions, and joining forces with other organizations, it is possible to spread the word about natural farming and promote sustainable farming practices.

Keywords – Natural inputs; digital marketing; Sustainable; Partnering; agricultural industry

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UTILIZATION OF CROP WILD RELATIVES: AN APPROACH TO ACHIEVE FOOD SECURITY DURING CLIMATE CHANGE

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Climate changes are predicted to have adverse impacts on food production, food quality and food security. Agriculture is extremely vulnerable to climate change. Two major challenges to continued global food security are the ever increasing demand for food products, and the unprecedented abiotic stresses that crops face due to climate change. By 2050, much of the world will experience higher temperatures than the hottest growing seasons of recent times and more variable climatic conditions followed by emergence of new pathogens and pest. The development of novel crop varieties with increased resistance to biotic and abiotic stresses by introgressing the traits from Crop Wild Relatives as well as maintenance of biodiversity is very important to feed future population. CWRs are distributed across a wide range of habitats, such as deserts, wetlands, grasslands, salt marshes, mountains etc. and have developed many different strategies for surviving in these adverse climatic conditions. The genetic traits that allow these species to thrive in extreme habitats are a valuable resource for plant breeding in the context of climate change. Crop Wild Relatives of field and vegetable crops constitute important resource for improving production and in ensuring food security. Wild relatives of domesticated crops serve as a reservoir of genetic material, with the potential to be used to develop new, improved varieties of crops. Development of high yielding Rice variety "IR 36", Wheat varieties developed during Green Revolution and "Nobilization of canes" in Sugarcane are some of the pioneering works using Crop Wild Relatives during 1960's and 1970's. Knowledge on Crop Wild Relatives available in different crops, their systematic use as parents in crop improvement programmes and development of novel varieties in different crops with resistance to biotic and abiotic stress and high yield will greatly enhance the potential to achieve food security targets around the world.

Key Words: *Climate, Change, Food, Security, Crop, Wild, Relatives, Improvement*

THE SUSTAINABLE DEVELOPMENT IN INDIA AND DEVELOPMENT PROCESS OF AGRICULTURE SECTOR

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The paper concentrated on the process of sustainable development and agriculture development in India country of India is renowned as the India lives in villages Land of Villages, around 68 percent of India's population lives in villages. Their primary occupation is agriculture and agricultural-related activities. It has a vital place in the economic development of India. The main objective of this research is to study sustainable growth and development of agriculture sector in India. It refers to an agriculture production and process of distribution system and promotes opportunities in family farming and farm communities, and minimizes adverse impact on health safety, wildlife, soil, water quality and the environment. It entails attaining equilibrium between the demand and supply of agriculture production. The result of green revolution may bring the efficiency in agriculture produce and thus, the productivity increases. It has been one of the main drivers of growth of the economy as it supplies was a major source of raw materials to most of the manufacturers. In areas where irrigation in the form of rivers and canals is not sufficiently available, ground water resources are heavily exploited. It is of utmost importance as many problems faced by farmers are related to this. Excess fertiliser usage not only makes the plants dependent on artificial fertilizers but also erodes the land quality, polluted ground water and in case of a surface runoff, pollutes the nearby water bodies. The planting crops which require more water like rice on the basis of irrigation facilities extended to areas which are water deficient uses up more water than required. It has several benefits over modern agriculture as it is cheap, conservation water, soil and environment, maintain crop diversity, and the food grains, produced are nutritious and free from pesticide residues.

Key Words: *Sustainable development, Importance of agriculture, problems of agriculture, working population, GDP, exports etc.*

ROLE OF MICROINSURANCE IN BOOSTING FARMERS INCOME

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Micro insurance in agriculture can provide farmers with financial protection against crop failures, natural disasters, and other risks associated with farming. These policies are typically designed to be affordable and accessible to small-scale farmers, who may not have the resources to invest in traditional insurance products. Some examples of micro insurance products for farmers include crop insurance, which covers losses due to natural disasters, pests, and other unexpected events, and livestock insurance, which covers losses due to death or illness of animals. By providing financial protection against these types of losses, micro insurance can help farmers to maintain their livelihoods and continue to produce crops, even in the face of adversity. This, in turn, can help to boost farmers' income and improve their overall economic well-being.

Additionally, micro insurance can also help farmers to access credit and other financial services, which can further support their income-generating activities. Micro insurance in agriculture also helps to mitigate the effect of climate change on farmers as it helps to protect against weather-related risks such as droughts and floods. It also helps to increase the resilience of farmers to cope with the impact of climate change on their livelihoods. Overall, micro insurance can play an important role in supporting the livelihoods of small-scale farmers and helping to boost their income.

Key Word: *Micro insurance, Financial Services, Farmers*

INFLUENCE OF NITROGEN LEVELS AND DE-TOPPING ON FODDER VALUE OF MAIZE VARIETIES IN SOUTHERN AGRO CLIMATIC ZONE OF ANDHRA PRADESH

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Field experiment was conducted at Regional Agricultural Research Station, Tirupati during kharif-2019 for evaluation of nitrogen levels and de-topping on fodder value of maize varieties as foliar sprays i.e. control, MNM @ 0.5%, MNM @ 1%, MNM @ 1.5%, MNM @ 2%, Water spray and 19-19-19 @ 0.5% on groundnut Dharani variety at 30 and 60 days after sowing. The experiment was laid out in Randomized Block Design and replicated thrice. The groundnut crop was sown at 22.5 cm x 10 cm spacing. impact of de-topping on the yield parameter and yield of maize varieties and economics The soils are red loamy. The results of experiment revealed that the highest groundnut pod yield of 3,594 kg/ha was recorded with mineral nutrient mixture spray @1.5% which was comparable with MNM spray @ 2% which recorded pod yield of 3,341 kg/ha. This was followed by MNM spray @ 0.5% (3,236 kg/ha), 19-19-19 @ 0.5% (3,170 kg/ha) and MNM spray @ 1% (3,004 kg/ha). Significantly lowest groundnut pod yield was recorded with control (2,827 kg/ha) which again on a par with water spray (2,865 kg/ha). In-terms of economics, the highest gross returns of Rs 2,21,034/ha, net returns Rs 1,22,529/ha with benefit cost ratio of 2.24 was recorded with mineral nutrient mixture sprayed @ 1.5% concentration at 30 and 60 DAS which was significantly superior over the rest of the treatments, however it was on par with mineral nutrient mixture sprayed @ 2.0 %. The additional benefit of Rs 44,461/- was recorded with MNM @ 1.5% over control. The lowest gross returns of Rs 1, 73,943/ha, net returns Rs 78,068/ha with benefit cost ratio of 1.81 was recorded with control.

The results of experiment conducted during kharif -2019 on maize varieties under different nitrogen levels with or without de-topping practices revealed that significantly highest growth parameters viz., total plant height, number of leaves in de-topped and non detopped portion recorded with fodder maize africantall variety compared to grain maize during de-topping. Significantly highest green fodder yield (de topped portion only) of 4107 kg/ha recorded with fodder maize africantall variety compared to grain maize which recorded 3420 kg/ha. Dry matter yield did not show any significance difference between the varieties. With respect to increasing levels of nitrogen from 0-150 kg/ha has positive effect interms of growth and yield parameters. With increasing levels of nitrogen from 0-100 kg/ha there is significance difference interms of green and dry matter yield and further increasing levels did not record significant yield difference during de topping process.

Key words: *De topping, Maize, Nitrogen*

ISOLATION AND SCREENING OF ACETOBACTER FROM SUGARCANE CULTIVAR OF BIHAR FOR PROMOTION OF NATURAL FARMING IN SUGARCANE

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The indiscriminate use of chemical fertilizer has disturbed the physico-chemical and biological property of soil. Its heavy use has reduced the water holding capacity, disturbed the soil texture and hampered the microbial activities inside the soil. Among the heaviest use of chemical fertilizer, nitrogenous fertilizer is one of the dominating fertilizers. So the alternative viable option of this fertilizer is Acetobacter. The endophytic nitrogen fixation concept has been recently gaining momentum. The biologically fixed nitrogen can supplement the nitrogen requirement of the crops in case of N deficit soils. Another important trait beneficial to the plant health is the production of phytohormones. Acetobacter diazotrophicus has the ability to produce both auxins and gibberellins in significant quantities. The present study is on the isolation, characterization and screening of endophytic bacterium i.e., Acetobacter diazotrophicus which was isolated from the tissues of surface sterilized roots, stem, leaf, and juice collected from various sugarcane cultivars. The morphological and biochemical tests permitted characterization of Acetobacter diazotrophicus isolates. The plant growth promoting traits such as nitrogen fixing ability, production of Indole Acetic Acid (IAA) and Gibberellic Acid (GA), phosphorus and zinc solubilization and antagonistic activity by dual culture method were assessed. Out of 18 isolates screened only 5 efficient isolates were selected based on nitrogen fixing capacity. An isolate from sugarcane S15 fixed maximum nitrogen i.e., 157 µg of N/mg of Carbon used and produced maximum concentration of Indole acetic acid (5.93 µg/ml) and Gibberellic acid (8.21 µg/25ml) respectively. The S15 showed phosphorus solubilization zone of diameter 3.2 cm whereas zone of zinc solubilisation of 3.5 cm. A. diazotrophicus is found within the plant tissue, the biosynthesis of IAA suggests that the bacteria could promote rooting and improve sugarcane growth by direct effects on metabolic processes, in addition to their role in N₂ fixation. An isolate from sugarcane S15 exhibited 43% inhibition against Colletotrichum falcatum. The S15 is more potent as compared to the reference strain G. diazotrophicus. Five efficient isolates viz., S3, S5, S6, S7 and S15, will be taken up for further studies.

Keywords: *Acetobacter diazotrophicus, sugarcane, Nitrogen fixing ability, Phytohormones, Phosphorus and Zinc solubilization*

ROLE OF CORPORATE SOCIAL RESPONSIBILITY IN ENHANCING AGRICULTURAL DEVELOPMENT

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Development of Agriculture continues to remain critical for India's economic growth, poverty reduction and ensuring food security of the country, as over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. A huge investment is required to address the current challenges of agriculture. These challenges provide space for a pluralistic eco-system to involve various players. The concept of corporate social responsibility (CSR) is often considered a potential tool for meeting societal demands and criticism as a company voluntarily takes responsibility for society. However, a very small amount of CSR fund has been spent in the agricultural sector by the companies though there is huge potential for investment in the sector. Agriculture is yet to attract the attention of India's CSR. Countries that had relatively high Agriculture growth saw substantial reduction in poverty. Hence, if the Corporate allocates more funds under CSR in agriculture, many challenges of the farm sector can be addressed. Corporate who have invested in Agriculture as part of CSR activities have seen a significant improvement in terms of adoption of improved agriculture practices, conservation of natural resources, reduction in external inputs and cost of cultivation, etc., in their project areas. The emphasis of CSR in the Agriculture sector needs to be in the areas of environmental sustainability, natural resource management, innovation and technology led development, social development, entrepreneurship development, livestock development, market development, farm advisory services, etc. In order to promote CSR activities in Agriculture, it is suggested to have a steering committee having broad based representation of various stakeholders, proper monitoring system at various levels, etc. Social investment is necessary in rural areas in the form of corporate social responsibility.

Key Words: *Corporate Social Responsibility, Agriculture, Poverty Reduction*

ROLE OF BIOAGENTS IN SUSTAINABLE DEVELOPMENT OF AGRICULTURE AND NATURAL FARMING

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Losses in crop production due to plant diseases by pathogenic fungi or bacteria amounts to 13% worldwide which greatly reduces the production, quality and safety of food. Plant diseases need to be controlled to maintain the quality and abundance of food, feed, and fiber produced by growers around the world. Regarding to food shortage, prevention of phytopathogens is one of the most important tasks for human beings. Numerous approaches may be used to mitigate plant diseases effectively and colossally. Conventionally preferred by larger population, due to easy approach involved in using synthetic chemicals to address the problem. However synthetic chemicals efficiency in mitigating phytopathogens got decreased with time due to development of pathogen resistance. Furthermore usage of synthetic chemicals can harm the environment, show pernicious effects on nontarget organisms and deteriorating human health besides adding burdens to resource poor farmers. Such problems towards the use of pesticides in agriculture needed a serious search to identify alternative methods for plant protection, which are environmentally safer and potent fungicides of natural origin. Various kinds of microbial antagonists are widely used for the bio control of fungal plant diseases. The PGPR viz., Arthrobacter, Azorhizobium, Azospirillum, Bacillus, Burkholderia, Enterobacter, Gluconacetobacter, Herbaspirillum, Klebsiella, Paenibacillus, Pseudomonas, and Serratia, PGPR can affect either directly or indirectly. Biological control with potential actinomycetes is also receiving greater attention all over the world. The beneficial micro organisms especially plant growth promoting rhizobacteria (PGPR) present in the rhizosphere of plants make intensive interaction and influence the plant growth and yield in addition antagonistic to plant pathogens. These bio agents helpful to farmers in order maintaining natural farming by reducing pesticide usage and cost of cultivation and avoiding deleterious effects on soil. These rhizosphere micro biota can promote plant growth by the production of certain metabolites which may also adversely affect the pathogens by competing in nutrients and space. These bio agents are also helpful to plants in making availability and uptake of nutrients from the environment. These bio agents especially plant growth promoting rhizobacteria are more in rhizosphere soil than non rhizosphere soil.

Keywords: *Pathogenic; synthetic chemicals*

TRADITIONAL AGROFORESTRY SYSTEM IN ASSAM AND THEIR RELEVANCE IN COMBATING CLIMATE CHANGE

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Traditional Agroforestry systems that farmers themselves develop without knowing the technical benefits which provide a specific example of a set of innovative practices. This practice has been designed to strengthen the system's ability to adapt to aberrant rainfall and adverse impacts of changing climate. In other way this often contributes to climate change mitigation through enhanced carbon sequestration, maintenance of biological diversity and climate moderation. Assam has a long tradition of agroforestry (AF) systems and several indigenous agroforestry systems based on people's needs and site-specific characteristics have been developed over the years. The traditional agroforestry systems in Assam include trees on farms, Boundary plantation, institutional plantations, living fences, community forestry and a variety of local forest management. In Assam, the practice of growing scattered trees on farmlands is quite old and has not changed much over centuries; these trees are multipurpose, used for shade, fodder, fuel wood, fruit, vegetables and medicinal uses. The present study was done in different districts of Assam through a diagnostic survey and design method and identified numbers of systems like silviculture, agri-silviculture, agri-horticulture. Agri-horti-silviculture, agri- silvi pastoral system, Sivipastoral system, agri-horti-aqua-pastoral system, pambaree, maronee etc. The combinations of different field crops, trees, fodders, vegetables can enhance the productivity as well as maintain the ecosystem balance by modifying the microclimate and also inhibiting pest and diseases. Traditional agroforestry practices benefit biodiversity through in-situ conservation of tree species on farms, reduction of pressure on remaining forests, and the provision of suitable habitat for plant and animal species on farmland. These systems conserve soil as well as moisture and also sequester C to combat the climate change. The traditional agroforestry system where diversified crops exist and which enhance the microbial biomass of the soil which equally help to below ground carbon sequestration.

Keywords: *Agro forestry; silviculture; plantation; ground carbon sequestration*

AN OVERVIEW OF ANDHRA PRADESH COMMUNITY MANAGED NATURAL FARMING

(APCNF) ACTIVITIES IN SRIKAKULAM DISTRICT.

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Community Managed Sustainable Agriculture (CMSA) was initiated by the Government of Andhra Pradesh (GOAP) in 2004 with the focus on alternative systems of farming with non-synthetic chemical management, soil health improvement and water conservation. In 2016 -17, GOAP launched the Andhra Pradesh Community Managed Natural Farming (APCNF) formerly known as Zero Budget Natural Farming (ZBNF) through Rythu Sadhikara Samstha (RySS), a not-for-profit Company; the programme has 1800 crore outlay until 2024. The funds are sourced through Union Government; Bharatiya Prakritik Krishi Paddhati (BPKP) and Paramparagat Krishi Vikas Yojana; a loan from KfW German state owned bank and Rs. 100 crore grant from Ajim Premji philanthropic initiative. APCNF has enrolled 1,40,000 Self Help Groups (SHG) and 5300 federations formed under RySS across the State. GOAP has a vision to bring in 6 million hectares of land under APCNF and save exchequer to the tune of 54,000 crores in the form of fertilizers and subsidies through adoption of the Principles of Natural Farming viz., Soil cover with crops; 365 days crop cover with living roots; Minimal disturbance of soils Diverse crops, trees, agro forestry 15-20 Crops; Integrating animals into farming; Bio stimulants for catalyzing soil biology; Increase organic residues on the soil; Use of Indigenous Pest Management and Non utilization of synthetic fertilizers, Pesticides, herbicides.

Srikakulam District was particularly selected for the purpose considering the fact of being backward in terms of economy. APCNF was initially launched in 9 mandals covering 40 Gram Panchayats (GPs) and grouped as 10 clusters in Phase I (2016-17) of its operation. The Phase II I (2017-18) was expanded to 15 Mandals, 16 GPs and 16 clusters. The Phase III I (2018-19) covered all the 38 Mandals in the district, 134 GPs and 17 clusters. During the year 2019-20, 44 GPs were identified under APCNF. Srikakulam district had the implementation of APCNF activities in 190 GPs and 43 clusters for the year 2020-21.

Keywords: *Community Managed Sustainable Agriculture; Diverse crops; Indigenous Pest Management; APCNF; Natural Farming*

NATURAL FARMING: A BUSINESS DIVERSIFICATION STRATEGY FOR COMMUNITY BASED ORGANIZATIONS

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Natural farming is getting renewed attention among key stakeholders. Being hooked into indigenous agricultural systems and practices, this form of farming is likely to be very helpful in not only reducing the hazardous effects of chemical fertilizers but also may have potential of cost saving for farmers as well as the nation (in terms of import bill). The products derived or manufactured from the agri-commodities produced through this system may also get better price provided appropriate business strategies are applied. Government of India and some of the Indian states are also setting up policy framework to promote natural farming.

Considering the involvement of a large population on agriculture, particularly those belonging to small and marginal category, it is important to examine the possibility of promoting such system through Community Based Organizations (CBOs). CBOs such as Self Help Groups (SHGs), cooperatives or Farmer Producer Companies (FPCs) have been set in large numbers during past few years. The scheme of the central government for setting up 10000 FPOs have also been instrumental in this process. These CBOs are largely working on agriculture and allied activities, primarily in production and collection activities. Their products generally cater to the traditional requirement of the markets. Some of them have already attained a reasonable economic base. However, to generate more value out of agriculture activities, there is a need to set up another business vertical in the existing organizational set up so that the benefit of the ground work already done by these CBOs (on creating a large base and membership) are gainfully utilized. This could be in the form of a diversification in business activities by including natural farming as one such option. This paper makes an attempt to understand how natural farming can be used as a business diversification strategy by CBOs particularly FPOs, for better value creation for the organization and farmers. The paper also explores role of other key stakeholders in the whole process and possible policy options.

Key Words: *Natural Farming, FPO, Cooperative, Strategy, Diversification, Farmer*

MARKETING OF GREEN PRODUCTS

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Marketing of green products is a strategy used by companies to promote and sell products that have a reduced environmental impact compared to traditional products. This can include products made from sustainable materials, products that are energy-efficient, and products that are biodegradable or recyclable. Green marketing is important as it helps to educate consumers and promote sustainable purchasing decisions, it also helps companies to differentiate themselves from their competitors, and it can also help to improve the overall environmental impact of a company's operations. Additionally, with more and more consumers becoming environmentally conscious, it can also be a way for companies to attract new customers and increase brand loyalty. Green marketing strategies include using eco-labels, promoting sustainable production methods, emphasizing the product's life-cycle assessment, highlighting the company's commitment to environmental sustainability, creating sustainable packaging, and using renewable energy sources in the manufacturing and distribution processes. Green marketing also includes communication and advertising efforts that make the target audience aware of the environmental benefits of the product and the company's commitment to sustainability, creating a connection between the company's brand and environmental values. Green marketing helps in increasing sales, reputation of the company, cost saving etc. However, green marketing also has some challenges. One of the biggest challenges is that consumers may not always be willing to pay more for environmentally friendly products or services. Additionally, it can be difficult for companies to prove the environmental benefits of their products or services, and there is a risk that consumers may see through false claims about environmental benefits.

Key Word: *Green Products, Green Marketing, Biodegradable*

MITIGATE CLIMATE CHANGE AND ENHANCE AGRICULTURAL SUSTAINABILITY FOR SMALL AND MARGINAL FARMERS OF ANDHRA PRADESH.

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Agriculture is more of an essential industry and plays a crucial role in maintaining and expanding the Indian economy. In the present scenario, Farmers rely more on chemical inputs like inorganic fertilizers and chemical pesticides which were contaminating not only groundwater but also other water bodies, leading to eutrophication and the emergence of harmful algal blooms that causes serious damage to aquatic ecosystems. Overuse of these external chemicals has long-term effects and poses a major threat to animal and human health. APCNF (previously Zero-budget Natural farming (ZBNF)) can be a workable approach which is ecologically sustainable and renews Indian agriculture. Natural farming assures food security and frees farmers from the debt cycle. It omits the use of all chemical inputs and relies only on eco-friendly natural products and processes. In natural farming, crop protection methods for pests and disease management depend on natural products. The four fundamental practices of zero-budget natural farming are "Jivamrita," "Bijamrita," "Acchadana"(mulching) and "Whapasa." Farming with no budget, promises to drastically cut input expenses and Farmers can operate with a shoestring budget relying on mulching, soil preservation methods, natural insecticides, and fertilizers. For instance, natural fungicides like sour buttermilk (khatti lassi) which is called 'Sonthastra' for disease management and 'Agniasthra', 'Brahmastra', 'Neemastra', 'Dashparni...etc. Can be used for insect pest management. APCNF had an impact on the farmers' adaptation, leading to an increase in the number of farmers practising, from 1.28 lakh to 2.37 lakh (nearly doubling) in the years between 2019–20 and 2020–21. It was also observed that CNF practises resulted in lower costs for plant nutrients and protection inputs than Non–CNF practises, with CNF farmers saving close to 363 crores of rupees on chemical fertilisers in the year 2020-2021 (IDS Survey 2020-2021). Hence creating advantageous externalities in the form of non-CNF farmers implementing some of the CNF farmers' crop-growing techniques and allowing farmers to grow chemical-free as well as healthy and safe food for sustainability. Under changing climatic conditions this natural farming culture brings a statutory phase to the farmer's economy by stabilizing the crop yields.

Keywords: *Climate change, APCNF, ZBNF, Natural farming, small farmer agriculture, Chemical farming.*

ASSESSMENT OF DISEASE REACTION OF NEWLY DEVELOPED SUGARCANE CLONES FOR

RED ROT AND SMUT DISEASES

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Sugarcane is one of the major commercial crops playing a vital role in agriculture and industrial economies of the country. It is cultivated in both tropical and subtropical regions in India, and a major source of sugar and bio-ethanol. Among fungal diseases, red rot and smut disease are the two important and serious diseases of sugarcane causing about 60-80% loss in yield. The infections also affect the juice quality parameters like brix, purity, extraction percentage and commercial cane sugar production. Growing of resistant varieties is one of the best management practices for avoiding the disease. Hence, the present study was undertaken to identify red rot and smut resistance in sugarcane genotypes under field conditions under artificial inoculation during the year 2020-21. Plug and nodal methods of red rot inoculation was done in 20 standing canes of each variety for two subsequent years, 7 months after planting. Inoculated canes were assessed by longitudinal splitting of the canes 60 days after inoculation. Among Thirty two genotypes evaluated for red rot resistance, two genotypes, i.e., 2017T17 and 2017T 108 showed resistant to moderately resistant reaction to all the three pathotypes tested in plug method and have showed resistant reaction in cotton swab method for these three pathotypes the rest of the genotypes reacted as either moderately susceptible/ susceptible/ highly susceptible. Smut reaction of the genotypes were evaluated by dipping the two budded sets of sugarcane genotypes in smut chlamydospore suspension for 30 min, later shade dried and were planted under field conditions. Smut incidence was recorded from first whip appearance till harvest. Three sugarcane genotypes i.e., 2017T 56, 69 and 121 showed susceptibility reaction to smut disease while twenty eight genotypes have shown resistant to moderately resistant reaction. The genotypes showing resistance could be used as resistant donors for breeding programme or released as resistant varieties upon agronomic evaluation.

Key words: Sugarcane genotypes, screening, red rot, smut, resistance

ASSESSMENT OF THE PERFORMANCE OF GREENGRAM VAR. WGG – 42 IN NELLORE DIST

CROPS RESPONSE UNDER DELAYED MONSOON CONDITIONS IN RAINFED ALFISOLS OF SOUTHERN ZONE OF ANDHRA PRADESH

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Field experiment was conducted at Regional Agricultural Research Station, Tirupati during *kharif*-2019 with a objective to identify suitable remunerative contingent crops in dry land alfisols, which will be beneficial to farmers in Southern Zone of Andhra Pradesh. The experiment was laid out in Factorial Randomized Block Design and replicated thrice. The soils are red loamy. The contingent crops viz., Pearl millet, Foxtail millet, Castor, Field bean, Redgram, Cow pea, Green gram, Fodder Sorghum and Horsegram crops were sown at their recommended spacing's with recommended dose of fertilizers. All the crops were sown at two fortnights i.e. August II FN and September I FN. The results of experiment revealed that among different contingent crops sown during II fortnight of August (sown on 24-08-2019) red gram recorded highest net returns and seed yield (Rs.48,540 net returns and 1,836 kg/ha seed yield), followed by field bean (Rs.48,270 net returns, 2,598 kg/ha vegetable and 965 kg/ha seed yield), castor (Rs. 45,580 net returns, and 1,818 kg/ha seed yield), fodder sorghum (Rs.37,223 net returns and 51,543 kg /ha green fodder), pearl millet as fodder (Rs.30,912/ha net returns and 44,032 kg/ha green fodder), foxtail millet (29,530/ha net returns and 1,415 kg/ha grain yield), cowpea (Rs.14,580/ha and 850 kg/ha seed yield). Negative net returns were recorded with green gram and horsegram which was due to continuous and incessant rains received during October 2019.

Among different contingent crops sown during I fortnight of September (sown on 06-09-2019) revealed that castor recorded highest net returns and seed yield (Rs. 1,35,965 net returns, and 3,369 kg/ha seed yield), followed by red gram (Rs.40,460 net returns and 1,634 kg/ha seed yield), pearl millet as fodder (Rs.34,673/ha net returns and 47,793 kg/ha green fodder), fodder sorghum (Rs.37,223 net returns and 51,543 kg/h green fodder), field bean (Rs.22,090 net returns 2,353 kg/ha vegetable and 589 kg/ha seed), foxtail millet (Rs. 7,570/ha net returns and 680 kg/ha grain yield). Negative net returns were recorded with green gram, cowpea and horsegram as the crops failed due to continuous and incessant rains received during October 2019.

Key words: Contingent, Castor, Redgram

**MIX OVER DI NITRO ANILINE GROUP OF HERBICIDES AS ALONE IN CONTROL OF
DIFFERENT WEED FLORA IN GROUNDNUT**

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Di nitro aniline group of herbicides act as either seedling shoot growth inhibitors or root growth inhibitors by interfering with new plant growth, thereby reducing the ability of seedlings to develop normally in the soil. These group of herbicides are mainly grassy weed killers and Broad leaf weed killers to some extent. The herbicides in these group (Pendimethalin, Butachlor, Alachlor) are sprayed on the soil surface before emergence of weeds and crop when there is enough moisture in the soil for proper spread of these herbicides in the soil solution for obtaining efficient weed control. Therefore, these herbicides are only effective on annual or perennial weed seedlings. Plants (weeds) that are already emerged from the soils are unaffected by these herbicides. When farmer won't spray these herbicides immediately after sowing or within 1-2 days after sowing of groundnut crop and take up spraying of these group of herbicides later at 4-5 days after sowing of groundnut as pre emergence spray, the weeds are not controlled effectively as the weeds emerge out by that time and weed control efficacy will be less. Under such situations, ready mix herbicides group of di nitro aniline (Pendimethalin) and Imidazolinone (Imazethapyr) are more efficient and wide spectrum in control of weeds when sprayed as pre emergence at even later stages (4-5 DAS) in groundnut crop as dintroaniline group of herbicides will control the weeds that are not germinated and imidazolinone group of herbicides will control both emerged weeds and emerging weeds. So, that the weeds may not escaped from the control and competition of the weeds for the moisture, nutrients will be less at initial stages of the groundnut crop growth.

Key words: *Imidazolinone, Dinitroaniline, Herbicides and Groundnut.*

OF ANDHRA PRADESH.

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Green gram (Mungbean) is an important pulse crop of India next to tur and Black gram. It plays an important role in enhancing the income of small and marginal farmers of Southern Andhra Pradesh. The production of Greengram in district is very less as compared to state and national average. However, the domestic requirements are also higher, due to this Greengram is being imported. With this the Krishi Vigyan Kendra, Nellore district conducted 6 On farm trial to Assessment of the performance of Green gram var. WGG – 42 in 2.4 ha farmers' fields in villages viz., Biradavolu during the year 2018 to exhibit test the latest variety technologies in comparison with local variety used in farmer's practice. The study revealed that the demonstrated variety WGG-42 recorded higher growth parameters i.e plant height 59.9 cm and yield attributes such as number of pods/plant (27), pod length (7.4 cm), number of seed per pod (9.8) compared to local variety. It was observed that demonstrated variety WGG-42 has significantly higher mean yield of 1008 kg/ha which was 27.27 % higher than the local variety used in farmers' practice (792 kg/ha). Higher Benefit: Cost ratio of 2.18 was obtained with demonstrated variety WGG-42 in comparison to local variety (farmers' practices) (1.69). As the results of on farm trial are positive. Therefore, there is a need to disseminate the improved technologies among the farmers with effective extension methods like training and demonstrations. The farmers' should be encouraged to adopt the high yielding Green gram variety WGG-42 for realizing higher returns.

Keywords: *Green gram, On-Farm Trail, Demonstrated variety WGG-42, Yield, B:C ratio*

CHANGE

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Inoculation of seed with a beneficial microbial agent for various purposes is termed as bio-priming. It can also be called as 'Biological Seed Treatment'. Different beneficial bio-agents are used including various strains of bacteria, fungi along with their consortium. It is an advanced technology of treating seeds that includes biological (inoculation of seed with beneficial organism to protect seed) and physiological aspects (seed hydration) as an alternative method to control many seed- and soil-borne pathogens. It is definitely a safe, non-polluting, and environmentally sound disease control measure and an effective pre-sowing seed treatment as it is using naturally occurring soil microorganisms. It helps a rapid colonization of the beneficial organism on the seed, and often results in a more uniform coverage of the seed surface as compared to other seed treatment techniques. It is a common practice in the seed industry worldwide. During the seed coating process, inoculants, fungicides, or insecticides are added together with other substances, which provide a protective barrier on the seed. In Bio-priming, during seed imbibitions temperature and moisture conditions of seeds are optimized. Microbial protectants used in the bio-treatment become established on the seeds. Seed priming increases the performance of seeds by improving its germination along with rapid seedling emergence. Bio-priming is a tool which enables the plants with better defense responses to combat biotic and a biotic stresses. During imbibitions seeds undergo a number of repair mechanisms like repairing membranes of cells and organelles, as well as protein and enzyme activation to breakdown the food reserve. As higher production and productivity of crops is possible only through use of good quality seeds and their proper management practices.

Keywords: *Bio-priming, Soil microorganisms, Inoculants, climate change*

PRADESH COMMUNITY MANAGED NATURAL FARMING (APCNF) IN SRIKAKULAM

DISTRICT.

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Andhra Pradesh Community Managed Natural Farming (APCNF) in Srikakulam District launched in December 2015 initiated various activities in implementation of the nine principles of Natural farming that suit women SHG farmers. The Natural farming principles focussed on Soil cover with crops; 365 days crop cover with living roots; Minimal disturbance of soils Diverse crops, trees, agro forestry 15-20 Crops; Integrating animals into farming; Bio stimulants for catalyzing soil biology; Increase organic residues on the soil; Use of Indigenous Pest Management and Non utilization of synthetic fertilizers, Pesticides, herbicides. APCNF team mobilized and encouraged 150 Sugarcane and Jaggery SHG farmers of Nimmathorlavada village in Amadalavalasa mandal to cultivate Sugarcane without application of expensive inorganic fertilizers, plant protection chemicals etc., and replace them with the ZBNF method of utilization of Dhravajeevamrutham and Ghanajeevamrutham prepared with the locally available resources. 26 Sugarcane growers from the village had an MOU with the Tirumala Tirupati Devasthanam, Tirupati for supply of 108 tonnes of organic Jaggery prepared for making of the Lord Balaji's prasadam @Rs 72 per kg of jaggery after the TTD representatives had satisfied with the package of practices adopted by the growers that suit their requirements.

Keywords: *Natural Farming; Soils Diverse crops; Organic Residues; Indigenous Pest Management*

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Natural Farming is currently a hot topic in the field of agriculture. It is considered as an agroecology based diversified farming system which integrates crops, trees and livestock with functional biodiversity (NITI Aayog). This method is considered friendly for the farmers as it does not include the use of chemical fertilizers ultimately resulting in the low input cost. In place of chemical fertilizers, the components being used are *jivamrit*, *bijamrit* and *ghanjivamrit* which are made from the desi cows' dung and desi cows' urine. The input cost of conventional and natural farming practices in rice, maize and groundnut when compared was found to be lower in natural farming compared to conventional farming (Gupta *et al.* 2020). Similarly, application of 100 per cent *bijamrit* to green gram seeds increased the germination percentage, root length, shoot length and seed vigour index of green gram (Vyankatrao, 2019).

With increase in population, there will be an increase in demand for nutritional security. The conventional method of farming does provide high yield but it comes at a cost i.e., degradation of the environment due to use of synthetic inputs. Natural farming alone cannot provide the food security; therefore, it must be a midway approach between conventional methods and natural farming methods to meet the demand and for sustainable production.

Keywords: *Natural Farming; nutritional security; conventional methods; sustainable production*

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World population is expected to increase from the current 6.7 billion to more than 10 billion people by the year 2050. This 45 % increase in the current world population will create demand for increased food and other raw materials. The dual pressures of population growth and climate change have adverse impacts on agricultural sustainability. As changes in environmental conditions accelerate, so does the need for germplasm resources to breed more environmentally resilient crops. Replacement of existing crop varieties with new varieties with improved resistance to diseases, pests and high yield can promise the challenging food security in future. A wide genetic base is essential for the development of new genotypes capable of surviving under heterogeneous environment. The development of novel varieties in different crops is the most pressing need in crop improvement programme and can be achieved by using different kinds of Plant Genetic Resources prominent for certain traits as parents. Plant Genetic Resources consists of land races, modern cultivars, obsolete cultivars, breeding stocks, wild forms and wild species of cultivated crops. PGR'S have an important role to play to ensure food security. PGR's form building blocks for the adaptation, evolution, and survival of species and for crop improvement programs that support sustainable development. Research on "allele mining", especially to detect genes for adaptation to climate change and emerging pests and diseases, is necessary to increase the utilization of conserved germplasm. Conservation and sustainable use of plant genetic resources is a key element for the progressive realization of the right to food. PGR's need to be secured for the future, using multiple strategies including in situ, on-farm, and ex situ conservation. Further exploration and collection of PGR from diversity-rich centres should also assume priority, recognising the high rate of loss of genetic diversity. Sustainable crop production is a way of growing food in an ecologically and ethically responsible manner that does not harm the environment and sustains communities.

Key Word: *Plant Genetic Resources, Food security, Sustainable, climate change, conservation, population, novel varieties, germplasm*

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The paper was undertaken with an object to find out the current status and future scope of natural farming. Conventional farming techniques have increased the yield over the past few decades, but it is observed that due to synthetic inputs, the soil is losing its organic content as a results there is decrease in the yield and those techniques also have adverse effects on Bio-Diversity. In this scenario, many other alternatives have emerged as a solution, natural farming being one of the better solution among them. The presented article delivers crucial information regarding the targeted farming technique i.e., natural farming initiated by Kisan Sathi Foundation in Sundargarh, Odisha. The paper shows how Kisan Sathi Foundation motivated the tribal framers and convinced the district administration in adopting natural farming through a pilot project in Telighana village, Sundargarh. Multiple scientifically-proven natural techniques and ecological approaches that are being implemented and how the tribal farmers got benefited are discussed for different aspects of farming. The paper shares detailed comparison of paddy and groundnut cultivation through Natural Farming and conventional farming, The number of pods in Groundnut was 14% higher in natural farming as compared to chemical farming with higher shelling (%) of 69. The average no. of EBT in chemically grown paddy was 5.2 and 7.1 in naturally grown paddy. The yield of all the crops under natural farming recorded higher yield compared to conventional practice (use of chemical fertilizers and pesticides). The crops showed resistance to moisture stress (drought), disease pest and remained healthy. The organoleptic test also indicated good taste of products. The implementation of this project which was appreciated in the national conference on "*Natural Farming systems and bio-diversity conservation under changing climate scenario*" which was organized by NAAS regional chapter, Barpani, Meghalaya. Lastly, the article provides the challenges faced, lesson learned for the past 6 years and recommendations on implementing and promoting natural farming to the farming community.

Key Words: - Natural Farming, Bio- Diversity, Soil, Tribal Farmers, Higher Yield, Conventional Farming.

GROUNDNUT - RED GRAM INTER CROPPING SYSTEM

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Field experiment was conducted at Regional Agricultural Research Station, Tirupati during the year 2020-21 with an objective to evaluate the relative efficiency of different organic sources and to find out their effective combination for improved crop growth and yield with sustained soil fertility status under Groundnut: Redgram cropping system. dry land alfisols in Southern Zone of Andhra Pradesh. The treatments include integrated crop management (ICM), Sahaja Sendriya Vyavasaya Vidhanalu (SSVV) and Palekar concept (PC). Significantly higher pod yield of groundnut (945 kg ha^{-1}) was recorded with ICM over SSVV (629 kg ha^{-1}) and Palekar concept (283 kg ha^{-1}) which recorded lowest pod yield. Significantly higher number of filled pods per plant was recorded in ICM (6.9) over SSVV (3.8) and Palekar method (2.5). Significantly higher hundred pod weight was recorded with ICM compared to PC and on par with SSVV. Significantly higher shelling percentage recorded in ICM (66.2) over SSVV (61.2) Palekar method (59.1). The highest groundnut pod equivalent yield was recorded in ICM followed by SSVV and PC. Groundnut/red gram (7:1) intercropping system performed significantly superior groundnut pod equivalent yields in ICM (1059 kg ha^{-1}) followed by SSVV (709 kg ha^{-1}). Significantly the lowest groundnut pod equivalent yield (321 kg ha^{-1}) was recorded in Palekar concept. This may be due to poor growth and branches in redgram resulted in the lowest seed yield in redgram as well as groundnut pod yield. The highest gross returns, net returns and benefit cost ratio were recorded in ICM.

Keywords: Key words: Groundnut, Redgram, ICM, SSVV, Natural farming