

>>> AGRICULTURE NEWS LETTER <<<

# MISSION ARABLE

## FARMING FORTUNE

VOLUME:01 || ISSUE:02 || NOVEMBER-2023



Welcome to the second edition of our Agriculture Newsletter MISSION ARABLE, brought to you by ARABLE EARTH PRIVATE LIMITED, Hyderabad. We hope that you enjoyed our newsletter of first edition. We got overwhelmed response from global farming community. In this edition we are coming out with another set of knowledgeable ideas about various agriculture topics. This news letter also exclusively dedicated to farming community. We are welcoming your suggestions and comments about this issue. Your inputs will finetune our efforts to bring knowledgeable newsletters in future. Be in touch with us.



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## HIGHLIGHTS OF THIS NEWS LETTER

VOLUME:01 || ISSUE:02

- About Integrated Farming.
- About Neem Powder.
- Unveiling the secret life of plant - Jack fruit.
- Green tech innovation: Mobile starters
- Nature's Defence: Natural Blowfit Solution.
- Importance of Biochar.
- Interview with Sri Dr. Sai Bhaskar Reddy.
- National seminar on "Biochar status and Opportunities" at ni-MSME, Hyderabad
- About Bambusa tulda.
- About Arable Earth Private Limited.

# INTEGRATED FARMING SYSTEM

## • INTRODUCTION

Small and marginal farmers are the core of the Indian rural economy constituting 85% of the total farming community. **Integrated farming system (IFS)** is recognized as a solution to the continuous increase of demand for food production, providing stability to the income and nutritional security particularly for the small and marginal farmers with limited resources.



**fig:01**

IFS is a mix of farm enterprises such as crop, livestock, aquaculture, poultry, sericulture and agro-forestry to achieve economic and sustained agricultural production through efficient utilisation of resources. The principle of IFS model is developed such as wastes generated from one component becomes an input for other system and hence there is efficient recycling of farm and animal wastes in the integrated system. There is increase in yield per unit area through intensification and diversification of crops. Apart from this IFS helps in controlling insect pests and diseases and weeds through natural cropping system management and there is less use of harmful agro-chemicals for farm production.

## • IFS DEVELOPMENT MODEL

The IFS model combines various compatible enterprises such as crops (field crops, horticultural crops), agroforestry (agri-silvi culture, agri-horticulture, agri-pastoral, silvi-pastoral, horti-pastoral), livestock (dairy, pigs, poultry, small ruminants), fishery, mushroom and bee culture in an synergistic way so that the wastes of one process become the input for other processes for optimum farm productivity.

In an IFS model, the field crops are grown for food production. Horticultural and vegetable crops can also provide 2-3 times more energy production than cereal crops and hence ensure nutritional security and income sustainability in the same piece of land. The crop residues after harvesting can be used for animal feed for dairy and goat production. The animal excreta from the animals can also be utilised as organic fertiliser or vermicomposting which in turn improves the soil fertility and thereby, reduces the use of chemical fertilisers. Again, the animal excreta can be dried, composted or liquid composted for the production of biogas and energy for household use.

When the poultry of duck are raised over the ponds, the dropping are utilised by the fishes as nutrients and hence increases their production. Therefore, crop-fish-poultry farming gave the highest net income with an improvement in soil health than single crop farming. By adoption and integration of various components like vegetables and fruit crops, reduce cost of cultivation and provide nutrients to the household.

## • ADVANTAGES

- Integration of different production systems provides an opportunity to solve malnutrition problems in our country.
- It improves soil fertility and soil physical structure from appropriate crop rotation and using cover crops and organic compost. It also minimizes the nutrient losses.
- It reduce weeds, insect pests and diseases through appropriate crop rotation.
- There is higher net returns to land and labour resources of the farming family.
- There is also regular stable income through the products like egg, milk, mushroom, vegetables, honey and silkworm cocoons from the linked activities in integrated farming.
- It reduces production cost of components through input recycling from the by-products of allied enterprises.

## • CONCLUSION

In a nutshell, an integrated farming system fulfils the multiple objectives of making farmers self-sufficient by ensuring the family members a balance diet, improving the standard of living through maximizing the total net returns and provide more employment, minimizing the risk and uncertainties and keeping harmony with environment. India has the rich diversity of livestock, poultry, crops and horticulture. Utilization of our national resources efficiently is very much important for sustainable development. Thus, this system of farming is very promising for improving overall farm productivity, profitability, generating employment opportunities, conserving natural resources and maintain the sustainability of agroecosystem by effective recycling the farm by-products and efficient utilization of available resources. Integrating Farming System is the unique approach for overall upliftment of rural community and conserving the natural resources and crop diversity.



**fig: 02**

# NEEM POWDER

## • NEEM POWDER

Neem powder is a natural and ecofriendly option for pest repellent. It contains compounds that acts as insect repellents and disrupt the life cycle of certain pests. We can sprinkle neem powder around plants or mix it with water to create a spray. However, its effectiveness may vary, and its advisable to use it as part of a broader integrated pest management approach for best results.

Neem powder is a natural and organic alternative to chemical pesticides in agriculture. It works as a broad-spectrum insect repellent and can also enhance soil health. Neem powder can be used in agriculture as a natural and eco-friendly pest repellent and promote plant health. Preventing Pest means preventing Disease & Fungal issues. Azadirachtin is the active Phyto chemical in neem powder.



fig:03

## • Here's how to prepare neem powder for agricultural use:

- Collection of neem fruits:** Collect fresh neem fruits from Neem trees or from the Local market.
- Clean and Dry:** Remove any impurities, such as Farm waste, Vegetative waste, Stones, Plastic, Soil and any other materials which cannot decompose. Then shade dry them till the moisture content reduces to 3 to 5%.
- Pulverise:** Once the Neem fruits are shade dried, make it into small bits and pieces by using suitable pulveriser.
- Storage:** Store the neem powder in a cool, dry place in gunny bags or polythene bags. Make sure it is kept away from direct sunlight and moisture.

## • APPLICATION OF NEEM POWDER

**Field crops :** 50gm/sq.mt, that means 200kg/acre.

**Vegetable crops :** 75gm/sq.mt, that means 300kg/acre.

**Horticulture crops :** 300gm/plant/annum.

These are the optimum recommended application of neem powder. Farmers can apply neem powder depending upon the situation.

**Note:** Better not to purchase neem powder from the market. It is strongly recommended to prepare neem powder on their own.

## • NEEM POWDER HAS SEVERAL BENEFITS IN AGRICULTURE

**Natural Pest Repellent:** Neem powder act as natural insect repellent. When applied to crops, it can help deter a wide range of pests.

Adding neem powder to the soil can improve its capability and structure.

**Organic Farming:** Neem powder is a popular choice for organic farming because it's a natural and non-toxic way to address many agricultural challenges without harming the environment or beneficial insects.

**Biodegradable:** Neem is environmentally friendly, as it breaks down naturally without leaving harmful residues. However, it's essential to use neem powder appropriately and in accordance with recommended guidelines to avoid any adverse effects on non-target organisms or plant.

## • What is the difference between NEEM POWDER and NEEM CAKE?

Neem cake and Neem powder are both derived from the neem fruit but the major difference is presences of Azadirachtin in them. Neem powder is a pulverised form of neem fruit. Neem cake is a byproduct in the production of neem oil. The main pest repellent quality of neem fruit comes from its major phyto chemical Azadirachtin. Neem cake doesn't have its pest repellent quality as the azadirachtin was extracted from neem fruit in oil form. Neem powder has Azadirachtin in its full form and it has very good pest repellent quality. Neem cake is just a bio mass of neem fruit without azadirachtin. Neem powder is a pest repellent with azadirachtin. Farmers should use neem powder as a natural pest repellent, but not neem cake.



fig:04



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HYDERABAD - 500 034

# UNVEILING THE SECRET LIFE OF PLANT - JACK FRUIT

The jackfruit is one of the most remunerative and important fruits of India.

**Scientific name :** Artocarpus heterophyllus,

**Family :** Moraceae,

**Kingdom :** Plantae,

**Genus :** Artocarpus,

**Species :** Artocarpus heterophyllus.



**fig:05**

Originally, jackfruit is native of India and presently cultivated throughout the tropical low land in both the hemispheres.

Wild jackfruit is found in Western Ghats of India. In India, jackfruit plantation is mostly done in Kerela, Tamil Nadu, Karnataka, Orissa, Assam. It can be found in Telangana, Andra Pradesh, Bihar, West Bengal, and Uttar Pradesh.

In other parts of the country, it is rarely grown in plantations but preferred very much in homesteads or as a shade tree or as a mixed crop. It grows throughout South India up to an elevation of 2,400 meters.

## • JACKFRUIT PLANTATION : USES AND COMPOSITION

Its fruits are used both for culinary purposes and as table fruit but it is mainly used for culinary purposes. Tender fruits appear in the market in spring and continue till late summer as popular vegetable. Since common vegetables are scarce and costly at that time of the year, jackfruit enjoys a high demand and premier price.

Ripe fruits are very sweet and have high nutritive value. The fruit contains minerals and vitamins A and C. Some people believe that jack fruit causes digestive ailments if taken regularly.

The fruits are also used for preparation of pickles, dehydrated leather, thin papad, soft drinks like nectar, squash and to some extent for canning purposes.

The rind of the fruit is rich in protein. Extract from the rind can be used for jelly making. The skin of the fruit and leaves are excellent cattle feed. Jackfruit tree is a valuable timber for making furniture as it is rarely attacked by white ants. The latex from the bark contains resin. Sometimes it is used to plug holes in earthen vats and baskets.

Thus, the tree is useful in many ways to the mankind.

## • SOIL AND CLIMATE FOR JACKFRUIT PLANTATION

Proper Jackfruit plantation requires rich and well drained sandy loam soil. Soil drainage is of great importance to jack fruit as is evidenced by the sudden decline of numerous trees in the areas suffering from a sudden rise of water level.

Jack fruit tree cannot tolerate moisture stress but presence of lime and chlorine is tolerable to some extent. Areas near the river beds are ideally suitable for its cultivation. Warm humid plains are suitable for jack fruit cultivation and it flourishes in humid hill slopes up to an elevation of 1,500 meters. Quality of fruit deteriorates in higher altitudes but grows satisfactorily in arid and warm plains of South India.

Cold weather and frost are harmful to its cultivation. Hot desiccating winds in summer also adversely affect the growth of trees.

However, distinct varieties are not available in jackfruit. Cultivated types are broadly classed into two groups by consumers, namely, soft flesh and firm flesh.



**fig:06**

## • A. SOFT FLESH

When fully ripe, the fruits yield to the thrust of a finger easily. The pulp is very juicy and soft. The taste varies from very sweet, sweet acidic to insipid.

## • B. FIRM FLESH

The rind does not yield to the thrust of finger easily. The pulp is firm and crispy. The taste is variable in degree of sweetness. Some distinct types are capable of maintaining their individuality even after propagation by seeds. These are:

### • I. RUDRAKSHI

It produces roundish fruits of the size of the pummelo. The rind is smooth, less spiny than the common jackfruit and the perianth is fleshy but the quality is inferior.

### • II. SINGAPORE OR CEYLON JACK

It has been introduced to India by Sri Lanka. This is highly precocious type, producing fruits after approximately 2½ years of planting the seedling.

The size of fruit is like common jack fruit. Some trees produce light off-season crop between September and December.

## • JACKFRUIT PROPAGATION



**Bud cutting**

**fig:07**

It is generally propagated by seeds and this leads to immense variation and prolonged juvenility. The seeds are sown immediately after extraction either in beds, polythene bags, earthen pots or in coconut husk pieces containing enough soil to cover the seeds.

Heavier seeds should be used for sowing purposes. The seeds should be soaked 24 hours in water and thereafter treated either with 25-50 ppm solution of NAA or 500 ppm gibberellic acid which results in improved germination and enhanced seedling growth.

Propagation by vegetative means offers handicap. Different methods of grafting have not given encouraging results or success.

However, inarching and air layering have been found effective in multiplying the jack fruit and it should be done from June to August

In recent years, epicotyl grafting has also given encouraging results.

Any injury to roots or breaking of earth ball will lead to the poor establishment of the plants at their permanent position. Direct sowing of seeds in the field and budding in situ from promising strains have been found beneficial to ensure better establishment of plants.

## • JACKFRUIT PLANTATION



**fig:08**

For jackfruit plantation, 1 x 1 x 1 m pits are dug at least 10 days before planting. About 30 kg well rotten farmyard manure and 500 g super phosphate are mixed with the soil of each pit and the pit is refilled. Approximately, 2 g/litre chlorpyrifos should be applied in the pit to avoid insect attack. In situ planting of 3 to 4 seed per pit leads to stronger plants. But nursing and raising of a large number of plants in this way is difficult.

After planting, the soil is pressed firmly to avoid waterlogging in pits during rainy season. This is important for jackfruit plantation as the jackfruit cannot withstand waterlogging. The best time for planting grafts or seedling is June to August.

Prolonged dry weather after planting may lead to the death of plants. The tap root should not be disturbed while planting, to avoid damage to the plants.

The square system of planting is commonly practiced for planting but hexagonal system may be followed in less fertile soils. In fertile soils, a spacing of 12 x 12 m accommodating 70 plants per hectare will suffice for this fruit crop.

## • FERTILISER APPLICATION

In Jackfruit plantation, an application of 75:60:50 g of NPK per year respectively up to 8 years and thereafter, the dose of 8th year taken as the constant dose for subsequent years, should be followed in jackfruit trees.

It has been observed that the young fruits (0.5-1.0 kg) suffer from browning and mature fruits show the symptoms of developing spongy and corky tissues along with whitish pockets in the fruit mesocarp.

## • IRRIGATION FOR JACKFRUIT PLANTATION

In India, hardly any irrigation is given to jackfruit. The tree is sensitive to drought, therefore, irrigation during dry periods is considered essential in arid regions for normal plant growth.

Generally, ring system of irrigation should be adopted for irrigating jackfruit trees as it also economises the use of water.

For young orchards, hand watering is necessary during first two to three years. The frequency of irrigation will depend on the soil moisture condition.

## • INTERCROPPING

It starts bearing after 5 to 7 years of its transplanting. Therefore, during this period the interspaces of the orchard should be properly utilised. Suitable crops should be grown every year till the trees reach bearing stage.

When the soil moisture is not a limiting factor, vegetable crop like okra, brinjal, chilli, tomato, and pulses like moong, gram etc. can be conventionally grown. These crops will also improve the nitrogen status of the soil.

## • INSECT AND PEST

There are about 7-8 insects attacking jackfruit but three of them are of economic importance. Two common pests are described here:

### I. SHOOT AND TRUNK BORER

It is often a serious pest in Assam, Uttar Pradesh and Bihar. It bores into the tender shoots and buds. After sometimes the affected parts become dried and ultimately, they (buds) drop off.

To control this pest, application of Sevin 50 % @ 4 g/litre of water by spray is advisable. Affected parts should be nipped off and destroyed.

### II. BROWN WEEVIL

It is also reported to bore into the tender buds and shoots. They may be controlled by destroying fallen fruits and buds and by collecting grubs and adults.

## • COMMON DISEASES FOR JACKFRUIT

Soft rot and pink disease are common diseases in jackfruit.

### I.SOFT ROT

It is a fungal disease found in jackfruit. In this disease, male flowers and small fruits are badly affected, whereas female flowers and mature fruits escape this disease. Humid atmosphere facilitates the spread of this disease. To control this disease, spray of Bordeaux mixture (0.4 %) in the month of January, February and March at an interval of 21 days should be done.

### II. PINK DISEASE:

Pink disease in Jackfruit mainly occurs in the Western Ghat and Nilgiri regions of India. White or pink spots are formed on the affected branches. It gradually covers the whole branch. When the disease becomes serious, peeling of the bark takes place.

All the affected branches should be severed and Bordeaux paste be painted on cut portions. To check the further spread of the disease, spray of Bordeaux mixture (2.75 kg copper sulphate + 1.8 kg slaked lime + 200 litres of water) should be sprayed.

## • FLOWERING AND FRUITING

Jackfruit is a monoecious fruit tree. Large number of flowers is borne on club-shaped rachis. The female spikes are borne on footstalks while male spikes appear both on the footstalks as well as the terminal branchlets.

Footstalks bearing female spikes are vigorous and have granular surface, while the male spikes are in the central and top region of the tree with thinner stalks and smoother surface.

Sex of a spike can be easily identified when it is small. The length and diameter of female spikes are much more than those of the males. Surface of a young male spike is smooth, while in the case of a female flower it is granular.

Both pollination and fertilisation complete within 3 to 6 days after the opening of flowers (anthesis). Irrespective of method of propagation, the tree starts bearing from the 7th or 8th year after transplanting.

The flowers generally start appearing in December and continue up to March and the fruit ripens in summer.

At higher altitudes, jack fruit growth may continue up to September. Occasionally, though rare, off-season flowering may be noticed. The axis of inflorescence, the multiple fruit, botanically called sorosis, the pericarp around each seed and the fleshy perianth are edible.

**Jackfruit is a multipurpose fruit tree.** It can be cooked as vegetable, ripe fruits used for table purpose and green mature fruit can be used for making pickles. The fruits develop during spring and summer. The fruits become ready for harvest in June or early July.

If the flowers on all sides are not pollinated, the fruit does not develop normally. The size is small and the shape may be irregular in less pollinated fruits. However, lack of pollination may lead to the drop of female spike.

## • JACKFRUIT HARVESTING AND YIELD

Bearing in jackfruit starts from the 4th year when a few fruits may develop, while the tree reaches its peak bearing stage within 15th to 16th years after planting.



fig:09

Tender fruits are harvested for use as vegetables during early spring and summer until the seeds harden. The fruit matures towards the end of summer in June. Period of fruit development is February to June.

Harvesting is done by cutting the stalks carrying the fruits. Normally, a tree bears a few to 250 fruits annually at this stage. The weight of the fruit varies widely depending on the type. Individual jackfruit may weigh from 10 kg to 50 kg. In 4th year 4 to 8 kgs, 5th year 6 to 12 kgs, 6th year 10 to 15 kgs, 7th year 12 to 20 kgs, 8th year 20 to 40 kgs, 9th year 35 to 60 kgs.

## • JACKFRUIT STORAGE AND MARKETING

In Jackfruit plantation, storage is also very important. Jackfruit has a good storage quality because of its thick peel. Jackfruit storage life of about 6 weeks is expected when the temperature is 0.1 to 12.70C and humidity between 85 to 90 per cent.

The initial quality and stage of maturity at harvest are important factors on which the storage life depends. Because of its good storage life, it can be transported to distant places for marketing. It does not need any packing or wrapping before sending to markets.

## WHY SHOULD YOU EAT JACKFRUIT?

- The richness of vitamin C, a potent antioxidant in jackfruit plays a key role in boosting the immune system.
- Jackfruit is bestowed with several health benefitting properties that may help with blood sugar control.

## CONCLUSION :

Agro climatic conditions of both Telangana and Andhra Pradesh states are well suited for the cultivation of jackfruit. Select suitable soils & suitable varieties of jackfruit for optimum yield.

There is lot of scope to promote jackfruit farming in this two Telugu states. Farmers in this states can cultivate jackfruit for good stable returns. Before go for cultivation of jackfruit it is better to take advice from Horticulture experts who are have knowledge & exposure in jackfruit Farming.

# MOBILE STARTER

## • MOBILE OPERATED WATER PUMP STARTER

In agriculture irrigation is the key role to get good quality yields. For this farmer has to irrigate their crops in time depending on availability of the power at any growing stage of the crop. Sometimes farmers have to switch on the water pumps in harsh climate or odd times. Many times, such conditions lead to great trouble and in convenient to the farmers. The new innovation of Mobile Operated Water Pump Starter is used to control and monitor electric motors, agriculture pump etc, through mobile phone using GSM technology. This is a GSM powered remote controller is used to switch ON and OFF electric devices from remote location. This wireless GSM remote controller helps the farmer to handle agricultural pump sets easily. It also helps the farmer to irrigate the crops in proper schedule. This automated system is a boon to agriculturists. It helps the Indian farmers to save life from snake bite in night time, saves water, time and electricity. Cell phone motor starter is a must device for farmers in today's world.



fig:10

## • SOME OF ITS FEATURES ARE

- Pump ON/OFF through missed call/Pump ON/OFF through SMS.
- Send Event message of Pump/Power status on power failure.
- Send Event message of Pump/Power status on power recover.
- Send SMS on Single Phasing fault condition
- Pump can be operated on fixed amount of time through SMS.
- User can get status any time through SMS (pump/power status on demand).
- Mobile nos. can operate pump (programmable).
- PASSWORD Protection to avoid unauthorized change of settings.

## • APPLICATION

GSM mobile motor starter are being used mostly in agricultural sectors, farm houses and remote locations when power supply is not regular and farmers have to feed water to their fields. GSM based water level controller find its applications where water pumps are installed far away from the residential colonies. It used in many industries and factories too where the overhead tank and starter locations are far away.

GSM mobile motor starter is also known as GSM / SMS motor starter controller, GSM Wireless water level controller, Cell phone motor starter and GSM SIM based Remote Starter Control System.

## • AN INTELLIGENT CONTROLLER FOR MULTIPLE MOTORS WITH AUTOMATIC CHANGEOVER

- Motor controller is useful for single or three phase motors.
- Low and High voltage protection for the all-motor Pump sets.
- Single phase prevention for all motors.
- If water under one motor pump is dry, it automatically switches OFF the same and switch ON the other motor.
- Pre-set timer to switch OFF one motor and switch ON other motor.
- Switch ON/OFF any number of motors by sending SMS through mobile phone.
- Exiting manual changeover of three phase power is replaced by automatic though SMS or missed call.
- Fire intimation to the farmer via SMS and Call.
- Burglar intimation to the farmer via SMS and Call.
- More than five different farmers can use control system separately.
- If well water level reaches certain point or dry, controller switch OFF the same motor and ON other motor.
- Trip valve is changed to desired direction based on the SMS send to the controller.
- Motor will turn OFF if raining.
- Outdoors are not able to turn ON / OFF the motor.
- Timer based motors ON / OFF and similarly for trip valve controller.



fig:11

In summary, the integration of mobile technology into agriculture is transformative, offering farmers the tools they need to make informed decisions, improve efficiency, and sustainably manage their farms.

# NATURAL BLOWFIT SOLUTION FOR EFFECTIVE PEST CONTROL

Very good solution to control the pest like Leaf roller, Stem Borer, Fruit Borer, Pod Borer. Preparing Organic Pest control solution for effective control of pest.

## • INGREDIENTS

- Urine of pure desi cow – 20 liters
- Green chilli – 500 gms
- Tobacco – 1 kg
- Garlic – 500 gms



fig:12

## • MAKING THE INGREDIENTS READY TO PREPARE SOLUTION

- Remove the pedicel (stem) of green chilli and make it into fine paste.
- Remove fleshy scale leaves of garlic bulb. Separate the cloves of garlic bulb.
- Remove skin of garlic cloves. And make it into fine paste.
- Make tobacco into pieces of one inch.

## • PREPARING THE SOLUTION

- Mix all of these four (Cow Urine, Green Mirchi, Tobacco and Garlic) ingredients.
- Boil it at medium heat. Preferably in a mud pot.
- Boil it till it overflows up to the neck of pot for five times.
- Then cool it to normal.
- Close the pot with net cloth.
- Keep it under shade/room for 48 hours for fermentation.
- After 48 hours, filter it to remove all residues of Mirchi, tobacco and garlic to make it into fine liquid.
- Mix 2 liters of this solution in 100 liters of water and apply it to infested plants/crop as foliar spray.
- Repeat it once again after 8 days.
- Shelf life of this solution is 90 days/3 months if stored in normal stage conditions.

**NOTE:** It is very powerful, high intensity natural pesticide. Apply any oil to body/exposing parts of the body while preparing and applying as spray. Mix it thoroughly every time before filling it into sprayer tank.

**Compiled by,**  
**Mr. N. Raghu Ram,**  
**Sampadha Farms and Consultants, Hyderabad.**

# BIOCHAR IMPORTANCE

## • BIOCHAR OFFERS SEVERAL KEY BENEFITS TO FARMERS IN AGRICULTURE

### WHAT IS BIOCHAR?

The solid material obtained from the thermochemical conversion of biomass in limited oxygen. Biochar is carbon rich substance, which is produced by pyrolysis method.

## • IMPROVED SOIL FERTILITY

Biochar has a high surface area and can hold onto nutrients, preventing them from leaching away. This means that essential nutrients remain available to plants for longer periods, leading to improved soil fertility.

## • ENHANCED WATER RETENTION

The porous structure of biochar allows it to absorb and retain water, reducing irrigation needs and helping plants survive during dry periods.

## • INCREASED MICROBIAL ACTIVITY

Biochar provides a habitat for beneficial micro organisms, fostering a healthier soil ecosystem. These microbes assist in nutrient cycling, disease suppression and overall soil health.

## • REDUCED SOIL EROSION

By binding with soil particles and improving soil structure, biochar can help prevent soil erosion caused by wind and water.

## • CARBON SEQUESTRATION

Incorporating biochar into soil can lock carbon away for hundreds or even thousands of years, aiding in climate change mitigation.

## • REDUCED DEPENDENCY ON SYNTHETIC FERTILISERS

Biochar's nutrient retention properties can reduce the need for excessive synthetic fertilisers, helping farmers save on input costs and decreasing the risk of nutrient runoff into water bodies.

## • CONCLUSION

By incorporating biochar into their farming practices, farmers can promote sustainable agriculture, improve soil quality and contribute to both environmental and economic benefits.



fig:13

# INTERVIEW-WITH DR. N. SAI BHASKAR REDDY

**Meet Dr. N. Sai Bhaskar Reddy: A Pioneer in Biochar Advancements in India.**

## • INTRODUCTION

Introducing our featured expert in this month's Newsletter, **Dr. N. Sai Bhaskar Reddy**, a pioneering authority in the field of biochar in India. With about two decades of experience and a deep commitment to sustainable energy, Dr. Reddy is here to share his profound insights into the world of biochar production and its far-reaching environmental and ecological benefits.

### **Q1: What initially inspired your interest and dedication to the field of biochar?**

**Dr. Reddy:** My journey into the world of biochar began during my extensive travels across India, where I encountered numerous soil and agricultural challenges. These experiences deeply sensitized and motivated me to study, research, experiment and address soil management for the sake of agricultural sustainability, food security, and livelihood improvement. Over the years, I've been dedicated to understanding the significant value of biochar amendments in soil and exploring its diverse applications.



### **Q2: Can you provide a succinct overview of what biochar is and explain the process of its production?**

**Dr. Reddy:** Biochar is essentially charcoal derived from biomass, utilized for various purposes. It is created by heating biomass to temperatures between 300 to 800 degrees Celsius. Even biochar produced as a byproduct in biomass cook stoves falls within this temperature range. However, biochar produced at temperatures exceeding 800 degrees Celsius or below 300 degrees Celsius can also be used but is less effective.

### **Q3: What are the primary advantages of incorporating biochar into agricultural and gardening practices?**

**Dr. Reddy:** Biochar is a versatile material with numerous applications that address critical agricultural and environmental needs. When used in compost, it reduces greenhouse gas emissions, minimises leachate, enhances moisture retention, improves soil fertility, and creates a favourable habitat for beneficial microbes.

### **Q4: How long does biochar typically remain in the soil, continuing to benefit plant growth and carbon sequestration?**

**Dr. Reddy:** Biochar is a versatile material with numerous applications that address critical agricultural and environmental needs. When used in compost, it reduces greenhouse gas emissions, minimises leachate, enhances moisture retention, improves soil fertility, and creates a favourable habitat for beneficial microbes.

### **Q5: Are there any connections between biochar and carbon credits?**

**Dr. Reddy:** Absolutely. Both biochar and carbon credits represent a permanent sequestration of carbon in the soil, effectively reducing CO<sub>2</sub> levels in the atmosphere.

### **Q6: Could you elaborate on how biochar sequesters carbon and contributes to mitigating climate change?**

**Dr. Reddy:** Biochar application reduces emissions of greenhouse gases such as N<sub>2</sub>O, CH<sub>4</sub>, and CO<sub>2</sub> from the soil by absorbing and adsorbing these gases, thereby mitigating their release into the atmosphere. This absorption of GHGs plays a crucial role in mitigating climate change by reducing the concentration of these gases in the atmosphere. Biochar acts as a carbon sink, trapping carbon and other GHGs in the soil, thereby helping to combat global warming and its associated impacts on the climate. This property makes biochar a valuable tool in carbon sequestration and climate change mitigation strategies.

### **Q7: Are there specific types of biomass feedstocks that are more suitable for biochar production than others?**

**Dr. Reddy:** Indeed, certain biomass feedstocks are better suited for biochar production. Human or animal bones are among the top choices (they less abundant), followed by materials like coconut shell, bamboo, Prosopis juliflora, and rice husk. Every biomass can be pyrolysed into biochar.

### **Q8: Are there ongoing research efforts focused on improving soil quality and carbon storage through biochar?**

**Dr. Reddy:** Currently, extensive research is being conducted in this field, with a strong emphasis on biochar. Even the Intergovernmental Panel on Climate Change (IPCC) recognizes biochar as a pivotal element in climate change mitigation. It's highlighted as the best geo-engineering solution within their framework for addressing climate issues. Biochar is often considered as a carbon-negative technology due to its ability to sequester carbon dioxide (CO<sub>2</sub>) from the atmosphere and store it in the soil for extended periods, effectively removing more carbon from the atmosphere than is released during its production process.

**Q9: Could you provide guidance on recommended application rates and methods for using biochar in different soil types and agricultural practices?**

**Dr. Reddy:** The combination of both methods, biochar and biochar compost, can be chosen. Preferably, biochar compost application should be favored, and biochar can be mixed with vermicompost, farm yard manure or poultry litter any other suitable organic manures in combinations. It is recommended to use a combination of biochar and compost for optimal results, rather than applying biochar directly.

**Q10: Beyond agriculture, in which other sectors or industries can biochar find valuable applications?**

**Dr. Reddy:** Biochar is a versatile bio-product that has applications in agriculture, industry, environment and energy sectors. Its uses extend widely; soil amendments; agriculture - crops, horticulture, hydroponics, floatigation, rooftop gardens etc.; water filtration; air purification; green buildings - biochar bricks; health sector and sanitation; sewage treatment; cosmetics; pharmaceuticals; sludge management; the food industry; etc.

**Q11: Are there any best practices to ensure the safe and effective application of biochar in agriculture?**

**Dr. Reddy:** Incremental application of biochar compost is a preferred method, allowing soil microbes to adapt to the altered environment. Additionally, some biochar can help remove salts and other contaminants from the soil when applied in combination with other materials.

**Q12: For individuals or farmers interested in using biochar, are there any training programs available?**

**Dr. Reddy:** Currently, there is a widespread awareness and understanding of biochar. There are seminars, conferences and workshops happening. There is no formal training available.

**Q13: Could you explain what bamboo biochar is and the process of its production from bamboo biomass?**

**Dr. Reddy:** Bamboo biochar is derived from bamboo biomass through pyrolysis. This involves the thermal decomposition of bamboo biomass in a closed container, typically at temperatures ranging from 300 to 800 degrees Celsius.

**Q14: Is there a distinction between charcoal and biochar, or are they essentially the same?**

**Dr. Reddy:** Charcoal and biochar are essentially the same, with some charcoals classified as biochar based on the application (use), production temperature, biomass feed, etc. Biochar term is mostly used for agriculture applications. I have defined the term broadly and coined the term "Biocharculture."

**Q15: What exactly is activated biochar, and what benefits does it offer?**

**Dr. Reddy:** Activated biochar is a highly porous, carbon-rich soil amendment that enhances soil structure, water retention, and nutrient availability, promoting overall soil health and plant growth.



In frame: Sujana, Indhu, Tejasri, Venkat Reddy, Dr. Sai Bhaskar Reddy, Kamalakar Reddy, Naresh, Ganesh

Thank you, Dr. N. Sai Bhaskar Reddy, for sharing your extensive knowledge and insights into the world of biochar and its remarkable applications in agriculture and beyond. Your expertise is invaluable in the pursuit of sustainable and environmentally friendly practices.

# BIOCHAR STATUS AND OPPORTUNITIES

National seminar at ni-MSME



fig:14

National seminar on Biochar- Status and Opportunities  
17 & 18 August 2023  
venue: ni-MSME campus, Hyderabad

## • INTRODUCTION

Biochar Status and Opportunities is a two-day workshop aimed at advancing sustainable agriculture and carbon sequestration in the regions of Telangana, Andhra Pradesh (AP), and Karnataka. This collaborative event is jointly organized by Biochar Crusaders, GIZ India, India Biochar and Bioresources Network (IBBN), National Institute of Micro, Small, and Medium Enterprises (NI-MSME), and Revitalizing Rainfed Agriculture Network (RRAN). The workshop will bring together a diverse group of stakeholders, including experts, private companies, carbon advisories, farmers, and civil society organizations, to explore the potential of Biochar as a transformative solution for sustainable agriculture and climate action.

## • OBJECTIVES

**Knowledge Exchange:** Facilitate an open platform for sharing knowledge, experiences, and research findings related to Biochar production, application, and its impact on sustainable agriculture and carbon sequestration.

**Technical Sessions:** Conduct in-depth technical sessions led by experts in the field, covering various aspects of Biochar production technologies, best practices, and integration into agricultural systems.

**Demonstration of Biochar Production:** Provide practical demonstrations of Biochar production techniques, showcasing different methodologies suitable for local contexts and resource availability.

**Carbon Markets:** To explore the potential of carbon markets in promoting biochar utilization as a sustainable agricultural practice and fostering regional collaboration among participants from Telangana, Andhra Pradesh (AP), and Karnataka.

**Discussions and Stakeholder Engagement:** Foster interactive discussions among participants, encouraging stakeholders from various sectors to collaborate and identify opportunities for promoting Biochar adoption and implementation.

**Capacity Building:** Empower farmers and stakeholders with the necessary skills.

We are very happy to present the outcome and results of the conference Biochar – Status and Opportunities which was held on the 17th and 18th of August 2023 at NIMSME(National Institute for small, micro and medium enterprises) campus at Hyderabad.

The conference brought together over 60 participants from 13 states, representing a diverse range of experts including private companies, CSOs, government departments, academics, farmers, and aspiring entrepreneurs.

The conference also had over 20 resource people invested in Biochar research, application, and markets.

The main objective of the conference was to facilitate an open platform for sharing knowledge, experiences, and research findings related to biochar production, its impact on sustainable agriculture and carbon sequestration. To also foster interactive discussions among participants, encouraging stakeholders from various sectors to collaborate and identify opportunities for promoting Biochar adoption and implementation to name a few.

The conference also served as a forum for representatives from all sides of the knowledge triangle to policy makers and government officials to interact and build bridges.

We had an excellent team of speakers expertising in various arenas to guide, encourage and foster us in the direction of sustainability and climate change throwing light on the importance of fellow individuals in contributing to change for a better planet to live in.

There was a very good response from all the participants and on both the days we have several group discussions, Q&A sessions, panel discussions wherein overall the seminar was really very interactive and well addressed and taken up by all.

## • SUMMARY AND HIGHLIGHTS

**Welcome address** Mr.K Surya Prakash Goud, Faculty from the school of enterprise development addressed and welcomed the delegates and all the fellow participants. He expressed his gratitude to the host, the managing and organising team for their dynamism.

He also outlined on how the event was intended to serve as a forum within the framework of a wider discussion on the future of innovation policies and integration of knowledge triangle.

After him addressing the audience the inaugurals started off with lighting of the lamp by the delegates which was initiated by Mr. R.K.Mehta, Chairman, Rainbow Bamboo Academy.

## • Welcome speech by Delegates

The context was set by Dr.Kshithij Urs, Executive Director, IBBN who emphasised on the importance of conferences like these to bring about awareness in the minds of fellow members and enlighten them towards the nearing future on climate crisis and directing ourselves towards a better solution.

## • Introduction to Biochar and its adoption in India

Jonas Bartholomay who is a Project Manager from Prosoil, GIZ introduced to everyone what biochar was and how the adoption rates were in India. He mainly threw light on the abundance of crop residues that is available and how that could lead to tremendous business opportunities even when practised at a lower level using rudimentary technologies.

## Practical experiences from a farmer



fig:15

Mr.Dharmalingam from Mulbagal, Karnataka shared his experiences with incorporating biochar into his fields.

An industrialist turned organic farmer he threw light on how each one of us could be a contributing factor to climate change and how we can rectify and be part of the solution by using biochar in our fields as well.

### Inaugural address

Dr.S.Glory Swarupa, Director General, NI-MSME

The inaugural session was followed by introduction of all the fellow participants wherein they shared their name, organisation that they represented and how their expectations from the 2 day conference.

### Biochar experiences in India and Africa

Dr.Dries Roobroeck from the International Institute of Tropical Agriculture IITA, Kenya addressed all of us virtually.

He mainly focussed on the soil and crop interactions with biochar, the tests and pilots that he was part of, his experiences from field and exclusively on farmer perceptions in Kenya.

### Dutch Carboneers in India

DR. H P Garewal who is a farmer and also a member of Biochar Crusaders shared majorly on the strategies, achievements and challenges that he came across and the simple yet effective solutions that he up with which was quite inspiring to all.

### Experiences from a marginal farmer

Mr. Prabhakar Buddappa who is a master trainer from RRAN (Revitalising Rainfed Agricultural Network) and a Marginal farmer shared his 40 years of experience with organic farming and his recent adoption of biochar, his field trials and experiences he has personally gained. He also explained how he incorporated bio inputs with biochar which ultimately resulted in an Increase in overall yield and many other benefits that he observed in his farm.

### Biochar production units – Case studies and experience sharing

#### Mr.Shankar.M.K., Arsta Eco

He mainly focused on how technology used should have the ability to work with different feedstocks and have good efficiency overall harbouring a good output.

He explained on how he has been experimenting with imprinting biochar i.e. mix and match various feedstocks to obtain a specific kind of biochar that can be used for specific applications.

### Mr.Manoj Natarajan

He is the founder and director of Goenvi Technologies Private Limited

His perspective on stubble burning and its consequences was quite relevant. He also emphasised on the need to come up with more models that are best suitable for farm level production of biochar.

How his experience of preparing biochar from banana waste and its application resulted in increased uptake of nutrients in his field and his few other experiments were quite interesting.

#### Mr. VidyutMohan from Taka Char

He spoke on how his organisation was more inclined towards environmental justice rather than on profit alone. He focused on different strategies to come up with a portable equipment to avoid large scale transportation, carbon credit loss and provide solutions to farmers in preparing fine quality biochar in their respective fields which was thoughtful and inspiring.

#### Mr. Shashank Joshi from AFPCL

### Biochar making Demo – Ring of Fire method



fig:16

Mr. Sameer Kanabargi from Phoenix Products, Belagavi and Mr.Shashank Joshi, Director from AFPCL demonstrated the ring of fire method wherein the participants were taught how to prepare biochar in the most simple way using residues obtained from pruning of trees from a garden from how to identify the difference between biochar and charcoal and the prevailing science behind preparation of biochar was well explained and moderated by IBBN team.

The event proved to be a significant step forward, fostering valuable connections that hold great promise for the future of biochar and sustainable food systems in India. Here are the key achievements of the conference:

### 1. MANAGE to help advocate Biochar as a 'Pillar' in the Natural farming mission:

The Director General of MANAGE, a pivotal agency for skilling under the National Mission for Natural Farming, expressed a commitment to championing Biochar as a fundamental component of natural and organic farming. They have pledged to advocate with the central government to integrate Biochar into the pillars of these farming practices.

## BAMBUSA TULDA

**Bambusa tulda** commonly known as Bengal Bamboo or Indian Timber Bamboo, is a fast growing medium-sized tropical clumping bamboo native to the Indian subcontinent, Indochina, Tibet, and Yunnan.

It is considered to be one of the most valuable multipurpose bamboo species, which usually grows up to a height of 20 m with culm diameters between 5-10 cm. In India it is used extensively by the paper pulp industry, but due to its nearly solid culms it is also an excellent and strong timber that can be used in construction and scaffolding.

**Scientific Name:** *Bambusa tulda*

**Family:** Poaceae

**Tribe:** Bambuseae

**Genus:** Bambusa

**Growth:** Habit Dense Clumping

**Origin:** India, Bangladesh, Bhutan, China, Laos, Myanmar, Nepal, Thailand, Vietnam.

**Common Names:** Indian Timber Bamboo, Bengal Bamboo, Spineless Indian Bamboo.



fig:18

### • RHIZOMES

*Bambusa tulda* has short pachymorph rhizomes which means that it grows in densely tufted clumps.

### • CULMS

The slightly drooping culms of *Bambusa tulda* are usually between 6-20 m tall with an average diameter of 5-10 cm. The culms have 36-60 cm long internodes which are very thick walled (1-2.5 cm at breast height and nearly solid at the base).

Young culms are covered with white blooms which gives them a dull green color. Mature culms have a mid-green or greyish green color and sometimes present 2 or 3 faint yellow stripes at the internodes near the base.

The nodes of this bamboo are slightly swollen, with bands of white silky hairs above and below the sheath scar. Basal nodes have short aerial roots.

fig:17

## 2. Biochar in existing organic agriculture policies:

MANAGE has also agreed to collaborate with IBBN in advocating for the incorporation of Biochar into existing organic agriculture policies at the state level. This partnership has the potential to drive significant policy changes in regions with established organic farming policies.

## 3. Regional Biochar training center at NIMSME:

A major breakthrough was achieved through our collaboration with NIMSME. They have agreed to partner with IBBN to establish a regional Biochar training center at their campus. This center will offer courses catering to a diverse group of stakeholders, playing a pivotal role in spreading awareness and knowledge about Biochar.

## 4. Extending MSME Schemes to include Biochar:

In another exciting development, NIMSME has committed to pursuing the extension of the central government's MSME schemes and programs to encompass Biochar entrepreneurs. This expansion holds the promise of providing vital support and resources to individuals and businesses engaged in R&D, innovation, manufacturing and production in the Biochar sector.

## 5. Consultation with Telangana State Forest Development Corporation:

The Telangana State Forest Development Corporation has recognized IBBN's expertise and sought our guidance in converting their sustainable biomass, totaling 70,000 tonnes per annum, into Biochar. This collaboration showcases the practical impact of our work and positions IBBN as a key player in the sustainable development landscape.



These accomplishments underscore the growing significance of IBBN's role in shaping the Biochar landscape in India. The conference's success and the subsequent collaborations serve as strong indicators of the transformative potential that lies ahead.

## • CULM SHEATHS

The triangular culm sheaths of *Bambusa tulda* are on average 15 cm long by 25 cm wide, with a conical blade of around 5–10 cm length. Culm sheaths are straw-colored and covered with appressed blackish-brown hairs on the upper surface. The sheaths fall off early.

## • SHOOTS

The young shoots are yellowish green in color with a powdery top. Shoots are slightly bitter and are suited to be pickled prior to being eaten.



fig:19

## • BRANCHES

*Bambusa tulda* develops many clustered branches per node, usually with 3 larger dominant branches. The lower parts of the culm are characterized by very predominant side-branches.

## • LEAVES

The lance-shaped leaves of *Bambusa tulda* are 15–25 cm long by 2–4 cm wide. The midrib of the leaf-blade is visible and has 12–20 secondary veins.



fig:20

## • LEAVES

Shoots start to grow at the beginning of rainy season and it takes them approximately 1 month to emerge above the ground. *Bambusa tulda* is a fast-growing bamboo as the shoots can grow up to 70 cm per day. Culms complete their growth within 2-3 months after they emerge as shoots.

## • HABITAT

*Bambusa tulda* is a tropical lowland bamboo. In its natural range it commonly occurs as an undergrowth in mixed deciduous forest, in moist alluvial flat land, valleys, and along streams or river banks up to an altitude of 1500 m. In moist areas, it often grows together with *Schizostachyum pergracile*, in drier parts with *Dendrocalamus strictus*.

*Bambusa tulda* grows best in moist areas with a mean annual rainfall between 1,200 - 2,500 mm and with average daytime temperatures between 22°C to 28°C. It prefers semi-shade areas but also succeeds in full sun. Soils should be loamy, fertile and well drained with high reserves of organic matter, nitrogen, calcium, potassium and phosphorus. Optimal pH is in the range of 5 - 6.



fig:21

## • FLOWERING

*Bambusa tulda* normally flowers gregariously for a period of 2 years in a cycle of 15-60 years, and produces viable seed. However, it also often flowers sporadically or in small groups, without an obvious cycle.



fig:22

## • CULTIVATION

**Soil:** Loamy (or) Sandy soil is ideal soil for *Bambusa tulda* with pH of 6.0 to 7.5 Slightly acidic to neutral.

**Climate:** *Bambusa tulda* thrives in tropical and subtropical regions.

**Plants per acre:** 500 plants per acre.

## • PROPAGATION

*Bambusa tulda* can be propagated by seed, rhizome cuttings, culm cuttings and by tissue culture. Under normal conditions, seed remains viable for only 1 month. When stored dry (in a desiccator over silica gel) viability can be extended up to 1.5 years.

The germination rate of *Bambusa tulda* seeds is usually around 60% and takes place fairly quickly as long as the seeds are of good quality, though it can take 3 - 6 months. In countries where seeds occur, young seedlings with 2-4 leaves are usually collected from the forest floor and grown in a nursery until they are large enough to plant out.



fig:23

Propagation by rhizome cuttings with direct planting in the field is a very successful propagation method (survival more than 90%). Rhizome parts should be taken at the beginning of the rainy season from 1–2-year-old culms and planted in pits of 60 cm at a spacing of 8 m × 8 m.

Branch cuttings can also be successful, but air and ground layering are not.

Dividing seedlings is another good propagation method. Take divisions from 9-month-old seedlings with at least three culms per clump, each bearing roots and rhizomes. The secret is to cause as little root disturbance as possible.

Plant the divisions in a fertile well-drained substrate and grow them under shade while regularly applying mist to the foliage. Once a good root system has been developed (which can take a year or more), the plants can be planted at their permanent location.

## • DISEASES AND PESTS

*Bambusa tulda* is slightly to moderately susceptible to bamboo blight (*Sarocladium oryzae*) which attacks young bamboos during, or soon after elongation growth, usually followed by secondary insect infestation which increases the damage. Drenching the soil of affected clumps with a fungicide (e.g., dithane M45) before the rains start improves the survival rates of new culms.

## • HARVESTING

Harvesting mature *Bambusa tulda* culms may start 5-7 years after planting. Normally 3–4-year-old culms are harvested, retaining at least 3-6 evenly spaced culms per clump. A 4-year felling cycle is often adopted.

After harvesting, the culms are traditionally submerged in running water for 10-20 days to improve its resistance against powder-post beetles. The culms are then air dried for 1.5 - 3.5 months.

## • USES

*Bambusa tulda* is one of the most useful *Bambusa* species because of its near solid culms and very strong timber. In India and Bangladesh, it is a major commercially exploited bamboo.

As a raw material, *Bambusa tulda* is extensively used by the Indian paper pulping industry. It is suitable for the manufacture of wrapping, writing and printing paper.

The culms are also used for reinforcing concrete, scaffolding, as a structural timber in construction, furniture, basketry, mats, household utensils, fishing rods, handicrafts, and bamboo lacquer ware. In Arunachal Pradesh, the species is used for Bansuri flute making, locally called "Eloo". During the Dree festival priests believe that the sound will keep the evil spirits away.

The shoots of *Bambusa tulda* are edible, but taste slightly bitter and are therefore often pickled. Fermented shoots are rich in phytosterols and can be used for the production of sterol drugs to lower cholesterol levels.

In agroforestry, *Bambusa tulda* is often planted as a wind-break around farms and fields.

## • MECHANICAL PROPERTIES

- Density 722 kg/m<sup>3</sup> at a moisture content of 12% (air dry).
- Fiber stress at elastic limit 26.2 N/mm<sup>2</sup> (green) - 38.1 N/mm<sup>2</sup> (air-dry).
- Modulus of rupture 51.1 N/mm<sup>2</sup> (green) - 66.7 N/mm<sup>2</sup> (air-dry).
- Modulus of elasticity 10.0 N/mm<sup>2</sup> (green) - 12.3 N/mm<sup>2</sup> (air-dry).
- Compression strength parallel to grain 40.7 N/mm<sup>2</sup> (green) - 68 N/mm<sup>2</sup> (air-dry).



**ARABLE EARTH**  
WE NURTURE THE NATURE

# ARABLE EARTH PRIVATE LIMITED

*Join the journey.....*

"FROM IDEAS TO IMPACT"

GET INSIDE OUR NEW STARTUP NEWS LETTER

**Welcome to Arable Earth Private Limited**

**We Nurture the Nature...**

**Dear Farmers, Enthusiasts, and Partners,**

We are thrilled to introduce Arable Earth Private Limited, a pioneering venture that stands at the intersection of tradition and technology in the world of agriculture. As we embark on this journey, our mission is to revolutionise the way we think about farming, ensuring sustainable practices, bountiful harvests and a flourishing planet for generations to come. Sowing the Seeds of Innovation in Agriculture is our aim.

## **Our Vision**

At Arable Earth, we envision a world where the beauty of farming is harmonised with cutting-edge techniques. Our vision is to be at the forefront of agricultural innovation, empowering farmers with the tools they need to enhance productivity, minimise environmental impact, and increase the profitability.

## **Our Commitment**

We are committed to Innovation: Unearthing groundbreaking solutions and technologies that redefine agricultural norms. From precision farming and smart irrigation to data-driven insights, we're dedicated to finding new ways to optimise every aspect of the farming process.

## **Sustainability**

Embracing practices that care for the Earth as much as they do for our crops. By prioritising sustainable methods, we are determined to preserve natural resources, minimise waste and create a lasting ecological balance.

## **Community:**

Cultivating more than just crops, we're nurturing a sense of togetherness within the farming community. We aim to foster knowledge-sharing, collaboration and the spirit of growth among farmers, experts and enthusiasts.

## **Our Offerings**

Arable Earth Private Limited is promoting bamboo plantation. Here are few concise lines outlining the benefits and advantages of bamboo. Bamboo is one of the fastest-growing plants, making it highly renewable. Bamboo absorbs more carbon dioxide than many other plants. Bamboo's extensive root system prevents erosion and enhances soil quality. Bamboo is used for diverse products from furniture to textiles and construction materials. Bamboo products are strong, lightweight, and long-lasting. Bamboo's natural compounds reduce the need for pesticides during cultivation. Bamboo products decompose naturally, reducing environmental impact. Bamboo cultivation supports local economies and livelihoods. Bamboo plantations provide habitats for various species and restore ecosystems. Bamboo requires fewer chemicals and land, promoting sustainability.

## **Value Adding to Bamboo:**

Arable Earth is proposing to establish value adding units to bamboo. Bamboo offers a wide array of by-products that can be derived from different parts of the bamboo plant. These by-products contribute to its versatility and usefulness in various industries. Arable Earth is proposing to produce Biochar, chips, pellets and briquettes by using bamboo as feedstock.



## **Advanced Agricultural Equipment:**

We provide a range of cutting-edge machinery and tools that streamline farming operations, making them more efficient and effective than ever before.

## **Data-Driven Insights:**

Our technology harnesses the power of data to provide actionable insights, helping farmers make informed decisions that can significantly impact yields and resource management.

## **Smart Irrigation Solutions:**

We understand the importance of water conservation. Our smart irrigation systems optimise water usage, reducing waste and maximising crop health.

## **Climate Monitoring:**

Stay ahead of changing weather patterns and environmental conditions with our climate monitoring tools. Be prepared for whatever Mother Nature has in store

## **Join Us on this Journey...**

We invite you to be part of our venture, whether you're a seasoned farmer or an agricultural enthusiast or an industry partner. Together, we can create a greener and more sustainable future. Our aim is one field, one crop and one innovation at a time.

Connect with us at [arableearth@gmail.com](mailto:arableearth@gmail.com) to explore how "**Arable Earth Private Limited**" can collaborate with you to cultivate growth and nurture life.

Here's to a promising future, rooted in the soil and reaching for the sky!

Sincerely,

**M/s. Arable Earth Private Limited,  
G 02-03 Ground floor,  
Shangrilla Plaza,  
Road No. 2, Banjara Hills,  
Hyderabad- 500 034, Telangana State, INDIA.**

**Phone: 040-40128999**

**Toll free: 1800 890 9919**

**Email: arableearth@gmail.com**

**www.arableearth.in**

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## EDITORIAL BOARD

**Mr. N. RAGHU RAM (Editor)**  
*nooksram@gmail.com*

### EDITORIAL TEAM

**NAVILA TEJASRI**  
*navilatejasree010@gmail.com*

**VOOK INDHU**  
*vookindhu459@gmail.com*

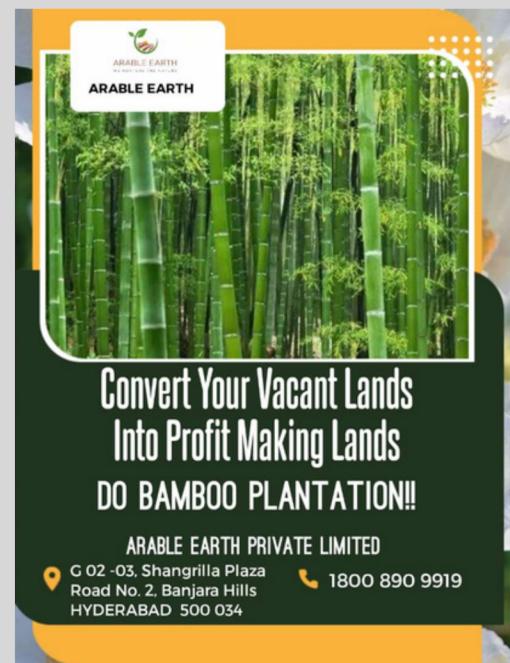
**KAMALAKAR REDDY**  
*kamalakarreddy2003@gmail.com*

**GOVINDHA GANESH**  
*govindaganesh5@gmail.com*

**NARESH GOUD**  
*goud8813@gmail.com@gmail.com*

**M. SUJANA (Co-Ordinator)**  
*sujanatatineni@gmail.com*

**Arable Earth Private Limited,**  
**G 02-03 Ground floor,**  
**Shangrilla Plaza,**  
**Road No. 2, Banjara Hills,**  
**Hyderabad- 500 034, Telangana State, INDIA**



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