

MISSION ARABLE

FARMING FORTUNE

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Welcome to the third edition of our Agriculture Newsletter MISSION ARABLE, Brought to you by ARABLE EARTH PRIVATE LIMITED, Hyderabad. As the seasons shift and our fields continue to flourish, we're thrilled to present the [Volume: 02||Issue: 01] January edition of our Agri-Insights Newsletter. This month, we delve into the latest agricultural trends, share invaluable tips for optimizing crop yields, and spotlight pioneering techniques shaping the future of farming.



HIGHLIGHTS OF THIS NEWS LETTER

VOLUME:02 || ISSUE:01

- About Multiple Cropping System.
- About Neem Oil uses and Benefit's.
- Unveiling the secret life of plant - Mango.
- Green Tech Innovation: Drone Technology
- Nature's Defence: Natural Efface Solution for potent fungi control.
- Bambusa nutans.
- Interview with Sri Sravan Kumar.
- News: Biochar Club of Hyderabad
- Importance of Biochar.
- About Arable Earth Private Limited.

MULTIPLE CROPPING SYSTEM

• INTRODUCTION

In agriculture, multiple cropping or multicropping is the practice of growing two or more crops in the same piece of land during one year, instead of just one crop. When multiple crops are grown simultaneously, this is also known as **Multiple Cropping System**. This cropping system helps farmers to increase their crop productivity and their income.



fig:01

CROPPING SYSTEMS IN AGRICULTURE:

1. Polyculture: It is cultivating more than two types of crops grown together on a piece of land in a crop season. For instance; cow-pea+banana+guava, litchi + papaya + tuberose + soybean, mango + pineapple + turmeric under Agri + Horti + silvopastoral systems.

2. Dual culture: It is cultivating two types of crops grown together or two types of enterprises on a piece of land in a crop season, such as rice+fish, rice+azolla.

3. Monoculture: It is cultivating a single crop in a given field in a crop season, such as rice, jute, sugar cane, cotton, tobacco, potato, or green gram.

4. Monocropping: It is cultivating a single crop in a given field season after season or year after year, such as rice, jute, sugar cane, cotton, tobacco, potato, or green gram.

5. Multiple Cropping: It is the practice of growing two or more crops on the same field in a year. Multiple cropping involves the intensification of cropping in temporal and spatial dimensions. Multiple cropping is a philosophy of maximum crop production per land area with a minimum of soil health deterioration.

MULTIPLE CROPPING PHILOSOPHY

The philosophy is based on the concept that:

- Maximum utilisation of land by growing more crops without complicating the resources.
- The high output is good for the soil.
- The minimum tillage promotes soil tilth and conserves soil organic matter, thus resulting in good physical conditions;
- The cover in the form of living mulch is a protection against all forms of erosion and weeds;
- Residues of manures and fertilisers utilise appropriately;

- The successive crop provides an opportunity for the efficient utilisation of land, labour, capital, and other available resources.

WHAT IS MULTIPLE CROPPING INDEX (MCI)?

When the operational holding is considered, the multiple cropping index (MCI) is determined by the total area planted divided by the total arable (cultivable) area. When the value is three or more, it is a most promising farm; this is also called intensive cropping system.

Examples/Types of multiple cropping

In the most effective way, multiple cropping is divided into two major categories-

1. Sequential cropping
2. Intercropping.

1. SEQUENTIAL CROPPING SYSTEM:

Definition: Growing two or more crops in sequence on the same field per year is called sequential cropping. The next crop is planted after the preceding crop has been harvested; crop intensification is only in the time dimension; there is no intercrop competition. Farmers manage only one crop at a time in the same field.

Sequential cropping

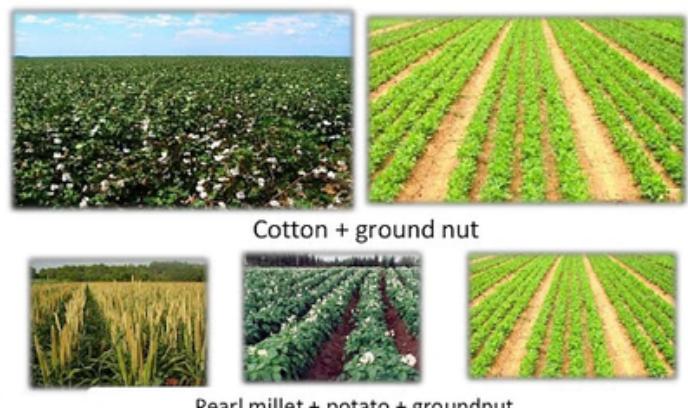


fig: 02

Examples/Types of Sequential Cropping Systems:

Four types of sequential Cropping are generally practiced. They are:

Double cropping: Growing two crops per year in sequence, for instance, rice followed by wheat or potato or mustard; maize followed by groundnut; wheat followed by cotton. Under this situation, cropping intensity is 200 percent.

Triple cropping: Growing three crops per year in sequence (or in succession) in a field in a year so that cropping intensity is 300 percent, for instance, rice-potato-rice; rice-potato-cow pea, or cow pea-mustard-jute.

Quadruple cropping: Growing four crops per year in sequence.

Ratoon cropping: Cultivation of crop regrowth after harvest, although not necessarily for grain.

2. MULTIPLE CROPPING SYSTEM:

Definition: Growing two or more crops simultaneously on the same field is called multiple cropping. Crop intensification is both in temporal and spatial dimensions; multiple crop competition occurs during all or part of the crop growth period.

Multiple cropping is an old practice used by subsistence farmers, especially under rainfed conditions. It helps in arranging a balanced diet, reduces labor peak, and minimizes crop failure risk. It has also been suggested that Multiple cropping reduces pests' adverse effects, provides higher returns and protects the soil against erosion.

Examples/Types of Multiple cropping

Multiple Cropping may also be of four types:

Mixed Cropping: Growing two or more crops simultaneously with no distinct row arrangement.

Row Cropping: Growing two or more crops simultaneously; one or more crops planted in rows.



fig:03

Strip Cropping: growing two or more crops simultaneously in different strips wide enough to permit independent cultivation but narrow enough for the crops to interact agronomically.

Relay cropping: growing two or more crops simultaneously during part of the life cycle of each; a second crop is planted after the first crop has reached its reproductive stage of growth but before it is ready for harvest.

WHAT IS THE BENEFIT OF MULTIPLE CROPPING?

Modern intensive cropping systems have created the following good impact in many countries:

- Improved stability of food and feed supply throughout the year.
- Increased productivity per unit area, time, input, and total production accompanied by an increase in the total income of the farmer.
- Improved distribution of income throughout the year with quick out turns and thus an increased possibility of recycling working capital.

- Increased total employment and distribution of labor and other capital use throughout the year and opportunities for on-farm seed production, preservation, processing and marketing.
- Minimised the scope of soil erosion and degradation.
- Maximised the possible utilisation of land, residual effects of manures, fertilisers, moisture and management practices.
- Minimised the rental value, irrigation charge and other imputed costs per unit of production.
- Broadened the scope to select and substitute crop varieties matching the agro-ecological situation, the cropping pattern and programs based on home requirements and market competitions.
- Extended the possibilities of almost complete removal of weeds as reduced fallow period minimises the reproduction of weeds.
- Improved the nutrition for the farm family from crop diversification.
- Created employment opportunities for farm laborers and others related to the processing and marketing of agricultural products.

The adverse impact/disadvantage of multiple cropping:

Due to intensive cropping, unfavorable effects have been observed in nutrient mining and soil health, resulting in soil degradation if it didn't follow proper nutrient management practices.

CONCLUSION:

In conclusion, multicropping represents a promising approach to sustainable agriculture, aligning with the principles of ecological diversity and resource efficiency. Its potential to address various challenges faced by modern agriculture underscores the importance of further research, education and implementation to fully realize its benefits. As we move forward, it is crucial to strike a balance between the complexity of multicropping systems and the practicality of adoption for farmers, fostering a more resilient and environmentally conscious approach to global food production.



fig:04

NEEM OIL USES & BENEFITS

INTRODUCTION: The neem tree (*Azadirachta indica*) is a versatile and beneficial tree native to the Indian subcontinent. Neem oil is a key product derived from various parts of the neem tree, particularly its seeds.



fig:05

Neem oil, derived from the seeds of the neem tree (*Azadirachta indica*), has been widely used in agriculture practices for its various benefits.

Neem oil is very effective ayurvedic remedy for a variety of skin diseases, hair loss, dandruff, acne or pimples, eczema, psoriasis and several other diseases. Neem oil reduces itching, removes dead cell debris and works as an antiseptic as well as disinfectant.

Pure Neem oil is extracted from the seeds and fruits of the Neem Tree (*Azadirachta Indica*). The colour of Neem oil varies according to its extraction method. It may have following colours.

1. Golden Yellow
2. Yellowish Brown
3. Reddish Brown
4. Dark Brown
5. Greenish Brown
6. Bright Red



fig:06

Pure Neem oil has a strong aroma and odour, which resembles with mixture of garlic and peanut. Neem oil contains Triterpenoid saponins (triterpenes). Azadirachtin is one of the most known Triterpenoid presents in the Neem. These phytochemicals are responsible for the bitter taste of neem oil.

PHYTOCHEMISTRY (ACTIVE CONSTITUENTS)

Neem oil contains triterpenes (Triterpenoid saponins). Azadirachtin is a common phytochemical present in neem oil, which has a great therapeutic value. The antiseptic, antimicrobial, antiviral, antipyretic, antifungal and antihistamine properties are contributed to neem oil due to the presence of Nimbin Triterpenoid.

Several sterols such as STIGMASTEROL, CAMPESTEROL and BETA-SITOSTEROL are present in neem oil. Pure neem oil contains Components.

FATTY ACIDS:

- Oleic acid (Omega-9 fatty acid) = 25 to 54%
- Hexadecanoic acid (Palmitic acid) = 16 to 33%
- Octadecanoic acid (Stearic acid) = 9 to 24%
- Linoleic acid (Omega-6 fatty acid) = 6 to 16%
- Alpha-linolenic acid (Omega-3 fatty acid)
- 9-Hexadecenoic acid (Palmitoleic acid)

ALKALOIDS:

- Nimbin
- Nimbidin
- Nimbinene
- Tannins
- Flavonoids
- Sesquiterpene Derivative

PROPERTIES:

Here are some common uses and benefits of neem oil in agriculture.

Neem Oil has following properties:

Pest Control:

Insect Repellent: Neem oil acts as a natural insect repellent, disrupting the feeding and reproductive cycles of insects. It is effective against a wide range of pests such as aphids, mites, whiteflies, caterpillars and beetles.

Fungicidal Properties: Neem oil has antifungal properties, making it useful in controlling fungal diseases like powdery mildew, rust and leaf spot.

Safe for Beneficial Insects: Neem oil is generally considered safe for beneficial insects such as bees and ladybugs, making it a preferred choice for integrated pest management (IPM) practices.

NEMATODE CONTROL:

Nematicidal Properties: Neem oil has been found to have nematicidal properties, helping to control soil-dwelling nematodes that can damage plant roots.

PLANT GROWTH PROMOTER:

Stimulates Plant Growth: Neem oil contains compounds that can enhance plant growth by promoting root development, improving nutrient uptake, and increasing overall plant health.

DISEASE PREVENTION:

Antibacterial Properties: Neem oil has antibacterial properties that may help prevent bacterial diseases in plants.

ORGANIC FARMING:

Approved input: Neem oil is accepted organic pesticide and often used in organic farming because it is a natural product that doesn't leave harmful & synthetic chemical ingredients.

SOIL AMENDMENT:

Soil Conditioning: Neem cake, a byproduct of neem oil extraction, can be used as a soil amendment. It improves soil structure, water retention and nutrient availability.

REPELLENT FOR LARGER PESTS:

Repels Larger Animals: Neem oil can be used to deter larger pests such as deer and rabbits from feeding on crops.

SEED TREATMENT:

Seed Coating: Neem oil can be used as a seed coating to protect seeds from soil-borne pathogens and pests.



fig:07

ENVIRONMENTAL IMPACT:

Biodegradable: Neem oil is biodegradable and breaks down relatively quickly, reducing its impact on the environment compared to synthetic pesticides.

It's important to note that while neem oil is generally considered safe, it's recommended to follow application guidelines, as excessive use may have negative effects. Additionally, it's advisable to conduct a small-scale test before widespread application to ensure compatibility with specific crops and to avoid any potential adverse effects.

BENEFITS:

Insect repellent, insecticide and pesticide:

Neem oil has insect repellent, insecticide and pesticide properties due to LIMONOID Alkaloids present in it. This phytochemical works hormonal system of insects, which helps either repelling them or killing them. Neem oil is a good natural bio-pesticide, which can decrease the requirement of chemical pesticides.

DOSAGE:

Neem Oil Concentration:

Insecticide/Fungicide:

1. **Foliar Spray:** Mix 0.2% neem oil with water (2 ml of neem oil per one liter of water).
2. **Soil Drench:** Use a higher concentration, up to 0.5%, when applying to the soil.(5ml per one liter of water)

Note: Due to its chemical properties neem oil won't mix in the water and don't stick on the leaves. To overcome these issues add two table spoons (30ml) of lime juice and 10ml of shampoo in 20 liters of water.

Systemic Pesticide:

For systemic control of pests, neem oil can be applied to the soil at a concentration of around 0.5%. (5ml of neem oil per liter of water)

APPLICATION FREQUENCY:

Preventive Treatment: Apply neem oil as a preventive measure at regular intervals, such as for every 7 to 14 days.

Curative Treatment: If there's a pest or disease outbreak, you may need to apply neem oil more frequently, possibly for every 5 to 7 days, until the issue is under control.

APPLICATION TIMING:

Apply neem oil early in the morning or late in the afternoon to avoid harming beneficial insects, such as bees, which are less active during these times.

MIXING WITH OTHER PRODUCTS:

Neem oil can be mixed with other pesticides or fertilizers unless otherwise specified on the product labels. However, it's always a good practice to perform a small compatibility test before mixing large quantities.

STORAGE AND SHELF LIFE:

Store neem oil in a cool, dark place away from direct sunlight. Neem oil can degrade when exposed to light and air.

Always check the expiration date on the neem oil product, and use fresh neem oil for better efficacy.

SAFETY PRECAUTIONS:

Wear appropriate protective clothing, such as gloves and eye protection, when handling neem oil.

Follow the manufacturer's instructions and guidelines for the specific neem oil product you are using.

Always refer to the product label and guidelines provided by the manufacturer for specific recommendations on dosage and application methods, as these can vary among different neem oil formulations.

Additionally, local regulations and recommendations may influence the application of neem oil in agriculture.



fig:08

MANGO

Mango (*Mangifera indica*) is the leading fruit crop of India and considered to be the King of fruits.

1. SCIENTIFIC CLASSIFICATION:

Kingdom: Plantae

Order: Sapindales

Family: Anacardiaceae

Genus: Mangifera

Species: *Mangifera indica*

Mangoes are believed to have originated in South Asia, in present-day India and Myanmar. The fruit has a long history in the Indian subcontinent, with references to mangoes found in ancient Hindu writings, including the Rigveda, which dates back over 4,000 years.

Mango cultivation and trade spread to other parts of Southeast Asia, including Thailand, Indonesia, and the Philippines. In India it is most popularly growing in Telangana, Andhra Pradesh, Uttar Pradesh which is 75% of the total area is followed by Tamil Nadu, Karnataka, Kerala, and Bihar.

Climate: Mango can be grown under both tropical and sub-tropical climate from sea level to 1,400 m altitude, provided there is no high humidity, rain or frost during the flowering period. Places with good rainfall and dry summer are ideal for mango cultivation. It is better to avoid areas with winds and cyclones which may cause flower and fruit shedding and breaking of branches.

Soil: Mango comes up on a wide range of soils from alluvial to laterite provided they are deep (minimum 6') and well drained. It prefers slightly acidic soils (pH 5.5 to 7.5). Soils with poor drainage and clay should be avoided.

2. HYBRID VARIETIES: Though there are nearly 1000 varieties of mango in India, only following varieties are grown in different states: Alphonso, Mallika, Amrapali, Mangeera, Ratna, Arka Aruna, Arka Pu neet, Arka Suprabhath, Banganapalle mangoes (Benishan).

Alphonso: Known as the "king of mangoes," Alphonso is a premium Indian mango variety with a rich, creamy texture and sweet flavor. It is often considered one of the best mango varieties.

Mallika - It is a cross between Neelam and Dashehari. Fruits are medium sized cadmium coloured with good quality, reported to be a regular bearer.

Himayat: have a notably soft skin, easy to bite through or even eat, and this also makes it hard to transport. Modern retail systems seem to be cracking how to acquire and distribute them carefully enough and this combined with a wider cultivation area has resulted in increased availability at retail stores

Dasheri: Dasherri plants have been produced and planted throughout India. People from the village of Dasherri near Kakori, Uttar Pradesh, have the mother plant. the first plant was found in " dashari" near Kakori Lucknow. This mango has the ability to get the attention. Its flavor and aroma are unmatched.

Kesar: This variety of mango is usually produced to the market in April-May and should be harvested at green mature stage with the cultivation beginning around October after the monsoon season. Kesar variety is among the most expensive varieties of the fruit.

Amrapali - It is a cross between Dashehari and Neelam. It is a dwarf vigorous type with regular and late bearing variety. It yields on an average 16 t/ha and about 1600 plants can be accommodated in one hectare.

Manjira: It is a cross between Rumani and Neelam. It is a semi vigorous type with a regular bearing habit. Fruits are medium sized with light yellow coloured skin, firm and fibreless flesh and sweet to taste.

Ratna: It is a cross between Neelam and Alphonso. It is a regular bearer and free from spongy tissue. Fruits are medium sized with excellent quality. Flesh is firm and fibreless, deep orange in colour with high TSS (19-21 Brix).

Arka Aruna: It is a hybrid between Banganapalli and Alphonso with regular bearing habit and dwarf in stature. About 400 plants can be accommodated per hectare. Fruits are large sized (500- 700 gm) with attractive skin colour. Pulp is fibreless, sweet to taste (20-22 Brix). Pulp percentage is 73 and the fruits are free from spongy tissue.

Arka Anmol: It is a semi-vigorous plant type from the cross between Alphonso and Janardhan Pasand. It is also a regular bearing and free from spongy tissues. Fruits ripen to uniform yellow colour. Keeping quality of the fruit is very good and it is suitable for export. It has got excellent sugar and acid blend and fruits weigh on an average about 300 grams Pulp is orange in colour.

Arka Suprabhath (H-14) -Mango hybrid H-14 is a double cross hybrid between Amrapali (Dashehari x Neelum) X Arka Anmol (Alphonso x Janardhan Pasand). It is a medium vigorous, regular and bunch bearing, high yielding (35-40 kg / plant after 4 years of planting). The fruit weight ranges from 250-300g, the fruit shape resembles like Alphonso. The pulp resembles Amrapali and is deep orange in colour and firm. Pulp recovery is >70%, TSS (>22°B), acidity (0.12%), carotenoids (6 mg/100g FW) and flavonoids (3.44 mg/100g FW). It has a shelf life of 8-10 days at room temperature.



fig:09

Banaganapalli mango is a mango variety generally known as The King of Mangoes, named after Banganapalli. An unspoilt obliquely oval specimen presents an unblemished golden yellow thin edible skin. These mangoes are large, weighing on an average 350-400 grams. The pulp is fibreless, firm and yellow with sweet taste. Banaganapalle Mangoes received a geographical indication tag in May 2017. Banaganapalle mangoes have been grown for over 100 years in Andhra Pradesh.

3.PROpagation

SEED PROPAGATION:

Mango trees can be grown from seeds, but keep in mind that the resulting tree may not produce fruits identical to those of the parent tree.

Remove the seed from a ripe mango and plant it in a well-draining soil mix. The seed should be planted with the pointed end down. For commercial orchards avoid seed propagation system.



fig:10

GRAFTING:

Grafted plants are recommended and most desirable for successful planting for commercial mango orchards.



fig:11

4.PLANTATION

Site Selection:

- Choose a location with well-draining soil and good sunlight exposure.
- Mango trees prefer slightly acidic to neutral soil.

Planting:

- Mango trees should be planted during the warmer months. In good management and expert supervision it can be planted in all seasons.
- Dig a hole large enough to accommodate the roots and add organic matter to the soil.
- Irrigate the tree regularly, especially during the first few years. Drip irrigation is strongly recommended.

Training and Pruning:

About one meter from the base on the main trunk should be kept free from branching and the main stem can be allowed thereafter spaced at 20-25 cm apart in such a way that they grow in different directions.

Branches which cross over/rub each other may be removed at pencil thickness.

Fertiliser Application:

In general, 170 gm urea, 110 gm single super phosphate and 115 gm muriate of potash per plant/year of the age from 1th and 10th year and thereafter 1.7 kg, 1.1 kg, and 1.15 kg respectively of these fertilisers per plant per year can be applied in two equal split doses (June-July and October). Foliar spray of 3% urea is recommended before flowering in sandy areas. Take advice from horticulture expert for correct dosage of fertiliser.

Inter cropping:

Inter crops such as vegetables, legumes, short duration and dwarf fruit crops like papaya, guava, peach, plum, etc. depending on the agro-climatic factors of the region can be grown. The water and nutrient requirements of the intercrops must be met separately.

5.PLANT PROTECTION:

Mango is prone to damages by a large number of pests, diseases and disorders. The recommended control measures for most important and common among them are: Mango hopper, Mealy bug, Powdery mildew, Anthracrose.

Fruit drop:

Regular irrigation during fruit development, timely and effective control of pests and diseases.

Harvesting and yield:

Graft plants start bearing at the age of 3 - 4 years (10-20 fruits) to give optimum crop from 10- 15th year which continues to increase up to the age of 40 years under good management.

6.POST HARVEST MANAGEMENT:

Storage:

Shelf life of mangoes being short (2 to 3 weeks) they are cooled as soon as possible to storage temperature of 13degree Celsius. A few varieties can withstand storage temperature of 10degree Celsius. Steps involved in postharvest handling include preparation, grading, washing, drying, waxing, packing, pre-cooling, palletisation and transportation.

Packaging:

Mangoes are generally packed in corrugated fibre board boxes 40 cm x 30 cm x 20cm in size. Fruits are packed in single layer 8 to 20 fruits per carton. The boxes should have sufficient number of air holes (about 8% of the surface area) to allow good ventilation. Financial institutions have also formulated mango financing schemes in potential areas for expansion of area under mango. Individual mango development schemes with farm infrastructure facilities like well, pump set, fencing and drip irrigation system etc, have also been considered.

DRONE TECHNOLOGY IN AGRICULTURE

INTRODUCTION

Drones have become increasingly popular in agriculture due to their ability to collect valuable data, monitor crops and improve overall farm management. Here are some key applications of drones in agriculture.



fig:12

The use of drones in almost every sector of the economy is growing fast, but drone usage in the agricultural industry is booming. According to some reports, the agricultural drone market is expected to grow from 1.2 billion (USD) industry in 2019 to 4.8 billion in 2024. From scouting to security, drone use will become more ubiquitous on large- and small-scale farms in a few short years. The information gathered by drones on farms is often used to better inform agronomic decisions and is part of a system generally referred to as 'precision agriculture'.

In many areas, drone use has become an essential part of largescale precision farming operations already. The data collected from drones recording fields help farmers plan their planting and treatments to achieve the best possible yields. Some reports indicate that using precision farming systems can increase yields by as much as 5% which is a sizeable increase in an industry with typically slim profit margins.

In this article we will take a look at some of the areas where drone technologies are already being used on farms, some new agricultural drone technologies being explored, and we will touch on some of the steps and challenges to adopting widespread drone use in agriculture.

CROP MONITORING AND MANAGEMENT:

- NDVI Imaging:** Drones equipped with multispectral cameras can capture images in different wavelengths, allowing farmers to assess the health of crops based on Normalized Difference Vegetation Index (NDVI) values.
- Plant Counting:** Drones can be used to count plants in a field, helping farmers estimate crop yields and identify areas with lower plant density.

PRECISION AGRICULTURE

Variable Rate Technology (VRT): Drones can be integrated with VRT systems to optimize the application of resources such as water, fertilizers and pesticides based on the specific needs of different parts of a field.

CROP SPRAYING

Precision Application of Pesticides and Fertilizers: Drones equipped with spray systems can precisely apply pesticides and fertilizers to targeted areas, reducing the overall usage of chemicals and minimizing environmental impact.

Early Detection: Drones can be equipped with sensors and cameras to detect signs of diseases, pests or other stress factors in crops at an early stage, allowing for timely intervention.

MAPPING AND SURVEYING



fig:13

Field Mapping: Drones can quickly and accurately map large agricultural fields, providing farmers with detailed information about topography, soil variability, and drainage patterns.

Land Surveying: Drones can be used for land surveying to plan and design agricultural infrastructure more effectively.

LIVESTOCK MONITORING

Animal Tracking: Drones can help farmers monitor the movement and health of livestock, reducing the need for manual checks and improving overall farm management.

WEATHER AND ENVIRONMENTAL MONITORING

Climate Data Collection: Drones can gather real-time weather and environmental data, helping farmers make informed decisions about planting, harvesting, and irrigation.

EMERGENCY RESPONSE

Disaster Assessment: In the event of natural disasters or emergencies, drones can quickly survey and assess the extent of damage to crops and infrastructure, enabling faster response and recovery efforts.



fig:14

DATA ANALYSIS AND INTEGRATION

Data Analytics: The data collected by drones can be processed and analysed using advanced analytics tools, providing farmers with actionable insights for decision-making.

Integration with Farm Management Software: Drone data can be integrated with existing farm management systems for a holistic view of the farm's operations.

When implementing drone technology in agriculture, it's essential for farmers to consider factors such as regulations, training requirements and the integration of drone data with existing farm management practices. Additionally, ongoing maintenance and updating of equipment are crucial for ensuring optimal performance.

DISEASE AND PEST DETECTION

Early Detection: Drones can be equipped with sensors and cameras to detect signs of diseases, pests, or other stress factors in crops at an early stage.



fig:15

CONCLUSION

Drones have already vastly altered the agricultural industry and will continue to grow in the coming years. While drone use is becoming more useful to small farmers, there is still a way to go before they become part of every farmer's equipment roster, particularly in developing nations.

Regulations around drone use need to be made and revised in many countries and more research needs to be done on their effectiveness certain tasks, such as pesticide application and spraying.

There are many ways drones can be useful to farmers but it is important to understand their limitations and functions before investing in expensive equipment.

Drone deploy, an agricultural drone supplier and programming company, suggest starting small and incorporating drone data into your organization.

Indian's farming sector is getting a hi-tech boost with Drones. Under the **Kisan Drone Scheme** Indian Government provided 100 drones to the Indian farmers. In India Telangana taking the lead in deploying drones for agriculture operations.

NATURAL EFFACE SOLUTION FOR POTENT FUNGI CONTROL

Very Good solution to control the fungus infestation in all crops/plants.

Preparing Organic fungus control solution for potent control of fungus.

INGREDIENTS:

Preparing the solution: -

- Make the dry ginger into fine powder.
- Mix it thoroughly into two liters of water.
- Boil it on medium heat till it became one liter.
- Cool it to room temperature/normal.
- Keep it aside.
- Boil five litres milk under low heat till it became two liters.
- Cool it to room temperature/normal.
- Remove the cream on milk.
- Take 200 litres of water and add the two-liter milk into it.
- Then add one-liter dry ginger solution.
- Mix it thoroughly in right direction for 5-6 minutes.
- Apply this natural efface solution on fungus infested crops/plants.
- Shelf life of this natural efface solution is not more than 48 hours.
- Mix it thoroughly every time before filling it into sprayer tank.

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BAMBUSA NUTANS

SCIENTIFIC CLASSIFICATION:

Kingdom: Plantae
Phylum: Angiosperms
Order: Poales
Family: Poaceae
Genus: Bambusa
Species: nutans

DESCRIPTION:

Bambusa nutans (also called 'Weeping Bamboo' and 'Weeping Clumping Bamboo', among many other common names) is a tropical clumping bamboo native to Southeast Asia. It grows up to 5 meters tall, with culms up to 3 cm in diameter. It prefers full sun to partial shade and moist, well-drained soil.

USES & BENEFITS:

Bambusa nutans is used for its strong and flexible stems, which are used to make furniture, baskets, and other household items. It is also used for landscaping and as an ornamental plant.

FLOWER, SEEDS AND SEEDLINGS

Bambusa nutans has small, yellowish-white flowers that are borne in short, dense spikes. Its seeds are small, black, and round. The seedlings are light green and have a tuft of white hairs at the tip.



fig:16

CULTIVATION AND PROPAGATION:

Bambusa nutans is a fast-growing, clumping bamboo that can reach heights of up to 20 feet. It prefers full sun and moist, well-drained soil. Propagation is best done through division of the clumps. The rhizomes should be divided in the spring or fall and replanted in the same soil conditions as the parent plant.

WHERE TO FIND BAMBUSA NUTANS

Bambusa nutans is native to India, China, and Southeast Asia. It can be found in nurseries and garden centers in these regions.

HABITAT:

- **Culms:** caespitose
- **Culm Diameter:** 5 - 10 cm
- **Culm Internode Length:** 35 - 45 cm
- **Wall thickness:** Thick-walled
- **Height:** 6 - 15 meter
- **Identification Features:** Culm Color-Green, with aerial roots from the nodes, nodes glabrous; Culm-sheaths 15-23 cm long, with appressed black hairs, auriculate; Culm-sheath blade triangular; Leaves: 15-30 cm long, 2.5-3.5 cm broad, Lanceolate; Inflorescence is clustered at the nodes; Fruit is an oblong Caryopsis with adherent pericarp.
- **Flowering Cycle:** 35 Years
- **Distribution:** India (Orissa, West Bengal, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Sikkim, Tripura, Uttar Pradesh, Uttarakhand), Bangladesh, Thailand
- **Altitude:** 600 - 1500 meter
- **Spacing for Cultivation:** 7 x 7 meter
- **Uses:** Building and Construction, poles, Pulp and paper.

VERNACULAR NAMES OF BAMBUSA NUTANS

Bidhuli, Mukial (Assam); Mallo, Mahi bans (Lepecha); Badia-bansa (Orissa); Kali, Beng, Makla (Tripura).

SYNONYM OF BAMBUSA NUTANS

Arundarbor nutans (Wall. ex-Munro) Kuntze, *Bambusa falconeri* Munro, *Bambusa crinita* Thomson ex Munro.

FLOWERING REPORTED

1894-96, 1966, 1979-80 and 1987-88.

Remarks: Reported from Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Orissa, Sikkim, Tripura, Uttar Pradesh, Uttarakhand, West Bengal.



fig:17

INTERVIEW with Mr. Sravan kumar

Meet Mr. Sravan Kumar an artisan with a wealth of experience in crafting exquisite bamboo products. With a keen eye for detail and a deep understanding of traditional techniques, this skilled individual transforms simple bamboo into functional and aesthetically pleasing items. From intricately woven baskets to durable furniture, their expertise reflects a commitment to sustainability and a profound connection to nature.



Q01: What techniques do you use to prepare and treat bamboo before creating your art pieces ?

V LIV IN Bamboo employs a combination of traditional craftsmanship and modern techniques in its product manufacturing. The company utilizes specialized methods for treating and processing bamboo to enhance its durability and versatility. These techniques include precision cutting, treating with environmentally friendly chemicals, and utilizing advanced assembly methods to create a wide range of bamboo products.

Q02: What is the Drying Time for Bamboo after harvesting ?

The drying time for bamboo largely depends on the specific product and the environmental conditions. Typically, bamboo requires a drying period of several weeks to ensure optimal strength and stability. V LIV IN Bamboo follows stringent quality control measures to determine the appropriate drying duration for each product, ensuring that the bamboo is thoroughly seasoned before being used in construction or manufacturing.

Q 03: What is the Lifespan of Chemically Treated Bamboo ?

When treated with the appropriate chemicals, bamboo can achieve an extended lifespan. V LIV IN Bamboo prioritizes eco-friendly and sustainable treatments to enhance the durability of their products. The lifespan of chemically treated bamboo can vary based on factors such as the treatment method, environmental conditions, and maintenance practices, but the company aims to provide long-lasting and resilient bamboo products.

Q 04: Can you explain the process of bamboo manufacturing from harvesting to the final product ?

V LIV IN Bamboo follows a comprehensive manufacturing process that begins with the careful harvesting of bamboo from sustainable sources. The bamboo is then treated to enhance its durability, cut to precision, and assembled using advanced techniques. The company places a strong emphasis on quality control at every stage, ensuring that each product meets rigorous standards before reaching the market.

Q 05: Can you share challenges in the Manufacturing Process ?

The manufacturing process of bamboo products comes with its own set of challenges, including sourcing quality bamboo, managing treatment processes, and ensuring consistency in product quality. V LIV IN Bamboo addresses these challenges through continuous research and development, investing in technology, and fostering partnerships with bamboo experts to overcome obstacles and deliver high-quality, reliable products.

Q 06: Can you discuss any innovation or advancement in bamboo manufacturing that you find interesting or have implement in the past ?

One noteworthy innovation in bamboo manufacturing that V LIV IN Bamboo finds intriguing is the development of bamboo composite materials. These materials combine bamboo fibers with other natural or recycled elements, creating products with enhanced strength and versatility. This innovation aligns with the company's commitment to pushing the boundaries of bamboo's potential and exploring new sustainable solutions in product manufacturing.

Q 07: What types of tools and equipment are essential for bamboo artistry, and are there any specialized tools you prefer to use ?

V LIV IN Bamboo utilizes a range of tools and equipment for bamboo artistry, including precision cutting tools, treatment facilities, and assembly machinery. While traditional hand tools are essential, the company also employs advanced technology to streamline the manufacturing process and ensure efficiency.

Q 08: How do you stay informed about marketing trends and customers preferences in the bamboo product industry ?

Staying informed about market trends and customer preferences is crucial for V LIV IN Bamboo. The company conducts regular market research, engages with customers through feedback mechanisms, and monitors global trends in sustainable construction and eco-friendly living. This proactive approach allows the company to adapt its product offerings to meet evolving consumer demands.

Q 09: How do you manage Inventory and Logistics in the bamboo product management ?

Efficient inventory and logistics management are key aspects of V LIV IN Bamboo's operations. The company employs advanced inventory tracking systems to monitor raw materials and finished products. By maintaining strong relationships with suppliers and optimizing logistics processes, V LIV IN Bamboo ensures timely production and delivery of its bamboo products.

Q 10: Are there any specialized/ preferred Bamboo Species ?

V LIV IN Bamboo carefully selects bamboo species that are locally sourced and well-suited for construction and manufacturing purposes. The company values diversity in bamboo species to offer a range of products with unique characteristics. Bambusa Balcoa, Bambusa Vulgaris, Bambusa Tulda, Dendrocalamus strictus, Dendrocalamus hamiltoni, dendrocalamus longispatnus etc are some of the species used. The preference is for bamboo varieties that are both durable and sustainable, aligning with the company's commitment to responsible sourcing.

Q 11: How do you manage Relationships with Suppliers and Farmers in the bamboo industry, and what criteria do you select suppliers ?

V LIV IN Bamboo places a high priority on maintaining strong and ethical relationships with bamboo suppliers and farmers. The company works closely with local communities to ensure fair and sustainable sourcing practices. Transparent communication, fair trade partnerships, and ongoing collaboration contribute to a mutually beneficial relationship with suppliers and farmers.

Q 12: How do you see the future of bamboo artistry evolving, and what role do you envision for traditional crafts in the contemporary art scene ?

The future of bamboo artistry is envisioned by V LIV IN Bamboo as a continued evolution towards innovative and sustainable solutions. The company anticipates a growing global interest in bamboo as a construction and manufacturing material, driven by increasing awareness of environmental issues. V LIV IN Bamboo aims to be at the forefront of this evolution, contributing to the development of cutting-edge bamboo products and sustainable building practices.

Q 13: What is driving your Organisation – Passion or Business:

For V LIV IN Bamboo, the driving force is a harmonious blend of passion and business acumen. The company is deeply passionate about promoting sustainable living and the inherent benefits of bamboo. This passion is coupled with a strategic and business-minded approach to ensure the long-term viability and success of the company. V LIV IN Bamboo believes that combining passion with sound business practices is essential for making a meaningful and lasting impact on the industry and the environment.



In frame G. Ganesh, Naresh, Mr. Sravan Kumar, G. Kamalakar, V. Indhu, N. Teja Sri



V LIV IN BAMBOO's prominence is rooted in its local expertise and deep understanding of regional needs. By integrating traditional craftsmanship with modern engineering, the company has successfully carved a niche for itself in the market. Telangana's residents have increasingly embraced bamboo as a viable and sustainable alternative for housing, and V LIV IN BAMBOO has been at the forefront of this transformation. The company's projects stand as testimonials to its dedication to delivering quality bamboo structures while promoting eco-friendly living. For any bamboo product enquiries contact Mr. Sravan Kumar, Hyderabad, on 97032 26266.

LOCAL ENTHUSIASTS LAUNCH BIOCHAR CLUB OF HYDERABAD FOR SUSTAINABLE PRACTICES

Hyderabad, 5th January. In an effort to promote sustainable practices and environmental awareness, a group of passionate individuals has recently inaugurated the Biochar Club of Hyderabad. The club aims to explore the benefits of biochar in agriculture, industrial and waste management, fostering a community dedicated to eco-friendly solutions. It also helps in combating global warming issue.

Inaugural meeting was held on 26th November 2023 at Hotel Ella at Gachibowli in Hyderabad, Telangana State, India. About 25 people from different sectors of the society attended this inaugural meeting. In this meeting after brainstorming discussion it is decided to have a body to promote Biochar. As decided Biochar Club of Hyderabad was launched on 26th November 2023.

A governing body was elected by the gathering members. Members of the governing body of Biochar Club of Hyderabad are Mr. R. K. Mehta is Chairman, Dr. N. Sai Bhaskar Reddy is the President, Mr. SK Gupta is Secretary, Mr. N. Raghu Ram is Vice President and Mr. SA Khan is Treasurer.

Participated members and governing body under the leadership of BCH Chairman Sri RK Mehta expressed their excitement, emphasising the club's commitment to promoting biochar's potential in carbon sequestration and soil improvement. Initial activities include workshops, educational sessions, and collaborative projects with local farms.

With membership open to all interested individuals, the Biochar Club of Hyderabad welcomes those eager to contribute to a greener future. Interested persons who wants contribute something to ecofriendly globe can contact Mr. SK Gupta, Secretary BCH for membership of BCH. Stay tuned for upcoming events and initiatives as this promising initiative takes root in our community."



BIOCHAR IMPORTANCE

PROPERTIES OF BIOCHAR

Biochar's sponge-like structure gives it several interesting properties. If one could unfold all the microscopic surfaces in one teaspoon of biochar it could add up to the size of a football field!

It is highly absorptive, it can take in large amounts of water, carbon, phosphorus, nutrients or hazardous substances. It not only attracts and retains these nutrients but allows them to be slowly released into the environment. As a result it also reduces leaching or washing away of nutrients. Giving structure to the soil reduces compaction and erosion. Since it has microscopic holes, these make wonderful homes for microbes such as bacteria and fungi.

IS BIOCHAR DIFFERENT FROM CHARCOAL?

Yes, Both are different: Both substances are carbon-rich but differ in important ways:

- Purpose:** Biochar is specifically used for improving soil health, industrial, pharma, cosmetics and other sectors. while charcoal is used for heating.
- Property:** Biochar is more basic and more porous than charcoal.
- Production:** Biochar is produced at 500-560° C while charcoal is produced at 200-300°C by using pyrolysis method.
- Biochar is having multiple benefits, charcoal has limited benefits.
- Biochar is produced by only Pyrolysis process.

BIOCHAR OFFERS SEVERAL KEY BENEFITS TO FARMERS IN AGRICULTURE

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.

How is biochar produced?

Biochar is produced by heating organic materials in an environment with minimal or no oxygen. This process is known as pyrolysis.

During pyrolysis, carbon that would otherwise be emitted into the atmosphere is instead retained within the original biomass. It may also contain traces of hydrogen, oxygen or nitrogen depending on feedstock and process.

Different pyrolysis technologies are available, ranging from do-it-yourself furnaces to expensive devices. This process is accessible even to individual farmers who can afford furnaces for their fields.

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:18



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BAMBOO- MULTIPURPOSE CROP

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Get good income year after year,
for every year up to 50 years.

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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** 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,

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Road No. 2, Banjara Hills,
Hyderabad- 500034, Telangana State, INDIA.
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Arable Earth Private Limited, based at Hyderabad, proudly unveils its refreshed identity with above new logo. Committed to innovation and sustainability, the emblem symbolizes the company's dedication to cultivating a greener and prosperous future.

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