

NEWSLETTER ibbn.org.in

India Biochar and Bioresources Network is a collective platform of individuals and institutions committed to circular agriculture models to significantly reduce Greenhouse gas emissions, increase carbon sequestration, and improve farm-related livelihoods in India through the effective use of the abundant bioresources. IBBN emerged out of operational collaboration between RRAN, the Revitalising Rainfed Agriculture Network and GIZ.



Mahalingaiah, a progressive farmer in Tumkur



On behalf of the Indo-German Development Cooperation and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH as implementing agency we congratulate IBBN on its first newsletter. As Part of the Indo-German Lighthouse on Agroecology, we support the overarching efforts to promote bioresources and biochar and continue the transition towards sustainable agri-food systems and Natural Farming.

Rajeev Ahal, Director, Natural resources management and Agroecology, GIZ.

The many researched benefits of Biochar

- Significant carbon storage in the soil
- Responsible for nutrient storage
- Improves Potassium, Calcium and Magnesium uptake
- Increases tree growth
- Promotes Root growth
- Produces higher Biomass and plant yield
- Increases the number of root nodules
- Increased microbial biomass carbon and nitrogen
- Reduces Nitrous Oxide emission from agricultural soil
- Reduces Nitrogen leaching
- Increase in Plant Phosphorus availability
- Water use efficiency
- Reduces the uptake of dangerous heavy metals
- Reduces soil compaction
- Increase in plant available water holding capacity
- Stable and remains in soil for hundreds of years

IBBN welcomes steps towards legalising carbon markets in India

IBBN welcomes the recent decisions by the Government of India to strengthen systems for a domestic carbon market. The first step was the draft plan by India's) for the gradual implementation of a national cap-and-trade system, the second was the Indian Lower House of Parliament (Lok Sabha) passing an amendment to the Energy Conservation Act of 2001 on July 29, 2022, which establishes the legal framework for the creation of a voluntary carbon credit trading system.

Each 1 percent increase in soil organic matter equals 8 tons of carbon per acre.

IBBN looks forward to the bill to be enacted soon and for the rules that follow to clarify on a timeline for implementation, the nature of the registered entities, how the credits will be generated and certified, and what agencies will be involved. Clarity is also sought on the minister's quote that there will be a ban on Carbon credit export.



IBBN Biochar field trials show encouraging results

IBBN is following six field trials in the South Indian state of Karnataka to review the effects of Biochar + organic fertilizers (B+O) on field crops and agroforestry in comparison with just organic fertiliser application. The impact of B+O in a Ragi (Finger Millet) test field in Kolar has shown significant gains.

impact measured in Biochar field

- **A bigger root zone**
- **Thicker stem**
- **Broader and greener leaves**
- **Darker soil**
- **30% more panicles.**
- **Higher concentration of earthworms**



The B+O Ragi plant in the right hand of the local farmer Prabhakar



The IBBN findings correspond with available literature on how biochar 'charged' with organic fertilisers can exhibit positive effects on soil health and crop yield due to several factors including increased nutrient availability, water retention capacity, soil microbial biomass, soil pH, and Cation exchange capacity. More such evidence building will go a long way in improved uptake among farmers and also demand for clear state policies.

Biomass in India – Important data

According to a recent study by the Government of India, the availability of biomass in India is estimated at about 750 million metric tonnes per year.

Challenges to sustainable use of Biomass

Total global open burning of biomass accounts for nearly 37 percent of global black carbon estimated at 2,760 Gg per year. Agriculture is considered to be the sector as the largest emitter of black carbon even if only approximately 60 percent of these emissions were related to agricultural activities. As studied solutions, IBBN interface between agricultural practices, social and institutional structures, public policy, and the global environment to promote conservation and responsible management of bioresources.

Farmer self-reliance in Biochar

An important objective of IBBN is to create accessible knowledge systems and demonstration models on ecological repurposing of biomass, sustainable management of crop and natural resources, and soil carbon management. Experience has shown peer to peer training involving farmers learning from each other has higher levels of skill adoption. These are pictures from some field sessions.



"I have heard from parents about something similar called Sudu Mannu which enriched soils during their times, and I am glad we are reviving this practice" - Sudha, a local farmer in Mulbagal, Karnataka.

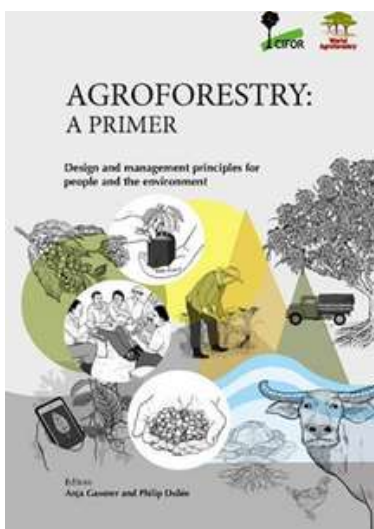
IBBN field training include a farmer to farmer learning process on zero-waste approach to resource management, local innovation, and integration of science into day to day farm activities.

Cost-efficient Negative Emission Technology (NET)



In a recent study, the Norwegian University of Science and Technology (NTNU) has found negative emissions can be achieved for all scenarios when accounting for a wide range of emissions (GHGs and NTCFs) throughout the entire life of Biochar. They also found some co-benefits in terms of soil emission reduction can be outweighed by emissions happening in the

supply chain. While greener transport technologies can help prevent this, IBBN is of the view that policies must promote decentralized production and use of Biochar with Gram Panchayats (Governments of village aggregates) at the center of decision-making on the effective use of Biomass in their jurisdiction.



Publication: Agroforestry - A primer

Conventional agriculture has left depleted or eroded soils in its path, watercourses that are polluted and drying up, and a food system that produces 20–40% of total greenhouse gas emissions. Agroforestry, as a production method will play an important role in the restoration of ecosystems and in supporting climate change mitigation, biodiversity conservation, sustainable agriculture, and other goals. This new publication by CIFOR and World Agroforestry is of particular interest because of its focus on the varied agroforestry as circular systems, principles of agroforestry design, management of trees, and stories from the front line. The primer, a useful resource is online and free.

Biochar's N₂O reduction more potent in the tropics

When conventional agriculture is responsible for up to 40% of total GHGs, this study indicates the potential of biochar to mitigate N₂O emissions will increase with global warming.



A multi-country study conducted finds that application of biochar made from Miscanthus (Silvergrass) significantly decreased N₂O emissions from N-fertilized tropical soil. The findings provide empirical evidence about the role of biochar in mitigating N₂O emissions from N fertilization under warming conditions, a contentious issue in agricultural lands of tropical regions.

The study also indicates that biochar effects on N₂O reduction to N₂ in soils increase with increasing temperatures and that at biochar application rates of 2.5 tonnes per hectare, the typical temperature-induced stimulation of N₂O emission can be avoided. In summary, Miscanthus biochar offset warming effects on N₂O emissions in a tropical sandy soil, and the mitigating results of biochar are strongest at high biochar rates and high temperatures.

THE NATIONAL POLICY FOR MANAGEMENT OF CROP RESIDUES (NPMCR)

Crop residues burning releases CH₄, CO, N₂O, NO_x and other hydrocarbons that have very high climate change potentials. Along with fossil fuels and construction materials, the seasonal biomass burning in agricultural fields is a major cause for air pollution, and soil and environmental degradation in India. The National policy that IBBN emulates, has the following recommendations:



- Promotion of **in-situ management** of crop residue like incorporation in soil, mulching, baling/binding for use as domestic/industrial fuel, fodder
- **Diversified use of crop residue** for various purposes in farms, industry and energy
- **Capacity building** to transit towards efficient management of the biomass
- Formulation and implementation of **suitable laws** to promote sustainable biomass use.

BIBLIOGRAPHY AND REFERENCES

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2. Challenges to sustainable use of biomass - Crop_Residue_Burning.cdr (icfa.org.in)
3. Negative emission technology – Norwegian university of science and technology
4. Agroforestry: A Primer – CIFOR and World Agroforestry
5. Biochar's N₂O reduction study - Frontiers | High Application Rates of Biochar to Mitigate N₂O Emissions From a N-Fertilized Tropical Soil Under Warming Conditions (frontiersin.org)
6. The National policy on management of crop residues – NPMCR_1.pdf (agricoop.nic.in)

Satellite-based Soil-Carbon Monitoring

A brief on the GIZ Soilify-ESTI Project in India and Kenya

Increasing human demands on soil-derived ecosystem services require reliable data on global soil resources for sustainable development. The soil organic carbon (SOC) pool is a key indicator of soil quality as it affects essential biological, chemical, and physical soil functions such as nutrient cycling, pesticide and water retention, and soil structure maintenance. Increasing soil organic carbon content is crucial for soil quality and climate change mitigation. SOC monitoring is indispensable to the corresponding policies and should provide results at the farm scale to allow for incentives.

Soil testing and SOC monitoring have been an integral part of agriculture and climate adaptation-mitigation strategies. In the last few decades, agriculture has benefitted from new technologies and advancements in testing and monitoring methods. However, robust soil data collection, testing, and field validations are complicated, expensive, and time-consuming.

Under the Innovation in Agriculture (i4Ag) fund by the German Ministry of Economic Cooperation and Development (BMZ), GIZ has recently launched a Soilify-ESTI project in India and Kenya to devise methods for monitoring and measuring regenerative agricultural practices through remote sensing technology. The project focuses on the development of an open-source satellite-based monitoring and evaluation system



for soil organic carbon content on the field level. The objective is to develop a digital control platform for automatised processing and administration of CO2 savings. The project aims to calibrate the satellite imagery and ground truth data into machine-deep learning algorithm.

The developed algorithm will be applied over selected geographies of partners at micro, meso, and macro-levels to measure and understand changes in SOC on field level, and thereby investigate the linkages to the carbon market. Carbon credits generated through soil carbon sequestration will help offset carbon emissions as well as provide an income for smallholder farmers.

Name of the Project	Satellite-based digital solutions for the valorisation of climate-friendly agriculture
Name of the Global Fund	Fund for the Promotion of Innovation in Agriculture (i4Ag)
Commissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)
Project Region	India, Kenya
Implementing Partners	ESTI, VAA, Spatialise, EAI, PnP
Duration	10/2021 - 12/2023



Satellite-based soil moisture analysis

A simple Toolbox to Enhance Soil Organic Carbon

By Manjari Hooda

Around 98% of the food we eat comes from soil. A critical fact people have always inherently known but taken for granted. For countries like India, farming and agriculture are also the main sources of livelihood for a wide majority of people. Soil thus forms the backbone of food and agricultural sector, and also the focus of collective efforts targeted towards conservation based land-use and agricultural practices. Saving India's fast degrading soils and faster depleting soil organic carbon levels is a race against time. A wide array of tools, technologies, and guidelines for investigating and remedying soil health have been recommended by various governmental and non-governmental agencies, research institutes, and groups working in policy. Farmers, being innately in the know of traditional and sustainable ways of the upkeep of agricultural land, are at the center of implementation.

Being the frontline stakeholders, the farmers need to be equipped with the right kind of tools and technologies that can help them achieve agronomic and economic benefits through reduction in fertilizer use and increase in crop yields. Soil protection and rehabilitation of degraded soil for food security in India (ProSoil) project implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of German Federal Ministry for Economic Cooperation and Development (BMZ) in partnership with National Bank for Agriculture and Rural Development (NABARD) equips the farmers with exactly these kind of capabilities, aka, 'farmers' toolkit'.

ProSoil helps farmers adopt and implement agroecological farming practices targeted towards soil protection and rehabilitation through sustainable and economical means, with co- benefits like positive carbon budgets and mitigation of negative climate effects. These include:

Vermicomposting:

a process through which earthworms are fed farm waste. They digest and excrete it, converting the organic matter into high



A woman farmer managing a vermicompost process

quality manure. It is highly effective, eco-friendly, and a low-cost way to produce manure that has high levels of nutrients and beneficial enzymes. The Bharatiya Agro Industries Foundation (BAIF), has successfully driven adoption of vermicomposting by farmers in Yavatmal and Amravati districts of Maharashtra. Farmers have reported increased crop-yields with the help of such compost produced in their own farms and backyards.

Green maturing:

it is an age-old practice involving addition of green undecomposed material in the soil, as manure, just before sowing the season's main crop. It is mainly obtained from growing 'side' crops. Green maturing helps increase soil fertility and restores its previously lost nutrients, minimizing the need to use chemical fertilizers. It also adds to the overall biomass or organic content of soil.

Application of biochar:

As the name suggests, biochar is basically a sort of charcoal that is made from plant biomass through processes like pyrolysis. It offers agronomic benefits in addition to long-term soil carbon enrichment. (see Q&A on biochar).

Crop residue recycling and conservation agriculture:

Based on the principles of permanent soil cover, minimal soil disturbance, and crop rotation, such practices are recommended for sustainable farming and land use.

Picture gallery of IBBN events

Passcode: 925283
India BioChar
Bioresource Network



IBBN
India BioChar and
BioResources Network

Inaugural workshop
**SOIL HEALTH BENEFITS OF BIOCHAR
AND ITS POLICY OPPORTUNITIES**


Presentation 1: Dr. A.K Biswas, IISS
Response: Dr. Bindu Mohanty, RRAN
Presentation 2: Dr. Aqeel Rizvi, ICRAF
Response: Dr. Priyadarshini, Samuchit Tech
Presentation 3: Navin Horo, GIZ
Host: Dr. Kshithij Urs, IBBN

30 MAY, 2022 . 11AM TO 1 PM




IBBN
INDIA BIOCHAR AND
BIORESOURCES NETWORK

ಕಾಮ್ ಬಳಗ
ಕ್ಲಬ್ ಹೌಸ್ ಕಾರ್ಯಕ್ರಮ 14




**ಬಯೋಚಾರ್
ಬಗ್ಗೆ ತಿಳಿಯೋಣ ಬನ್ನಿ**



ಗಜಾನನ ವರಭು, ಮಹಾಲಿಂಗಪ್ಪ
ಹಾಗೂ ಅರುಣಾ ಅವರೊಂದಿಗೆ
ಸಂವಾದ

ಬುಧವಾರ, ಜೂನ್ 15, ಸಂಜೆ 7ಕ್ಕೆ



Public workshop on field experiences of four farmers using Biochar

ಸಾಂಪ್ರದಾಯಿಕ ದೇಶೀಯ ಧಾನ್ಯ ಉಳಿಸಿ, ಬಳಸಿ

■ **ವಿಕ ಸುದ್ದಿಯೊಳಿ ನೆರಲಿ**

ರೈತರು ರಾಸಾಯನಿಕ ಗೊಬ್ಬರ, ಪೈಕ್ರುಡ್ ಬಳಕೆ ಬೀಜಗಳನ್ನು ಒಳಸುವುದರಿಂದ ದೇಶೀಯ ಧಾನ್ಯಗಳು ಕಣ್ಮರೆಯಾಗುತ್ತಿವೆ. ಆದ್ದರಿಂದ ಸಾಂಪ್ರದಾಯಿಕ ಮತ್ತು ದೇಶೀಯ ಧಾನ್ಯಗಳನ್ನು ಉಳಿಸಬೇಕಾಗಿದೆ ಎಂದು ಪ್ರಗತಿ ಚಾರಿಟಿಬಲ್ ಟ್ರಸ್ಟ್ ಅಧ್ಯಕ್ಷ ಮುನೇಶ್ ಹೇಳಿದರು.

ಬೈರಕೋಡು ಗ್ರಾಮ ವ್ಯಾಪ್ತಿಯ ಪೂಜೇನಹಳ್ಳಿ ಮತ್ತು ಗೌಡನಹಳ್ಳಿ ಗ್ರಾಮಗಳ ಫಲಾನುಭವಿಗಳಿಗೆ ಬೆಂಗಳೂರು ಮಾರ್ಗ ಸಂಸ್ಥೆ ವತಿಯಿಂದ ಎರಡೂ ಗ್ರಾಮಗಳ 60 ಮೂಲಾ ರೈತರಿಗೆ ಹಾಗೂ ಶೋಷಣೆಯ 15 ಮೂಲಿಕೆಯರಿಗೆ ಆಕೃತಿ ಸಾಲುಗಳಲ್ಲಿ ಹಾಕುವ ಧಾನ್ಯಗಳನ್ನು ವಿತರಿಸಿ ಮಾತನಾಡಿದರು.

ಸಾಂಪ್ರದಾಯಿಕ ಸಾವಯವ ಬತ್ತಿನ ಧಾನ್ಯಗಳಾದ ನವಶೆ, ಸಜ್ಜಿ ಅಲಸಂದೆ, ತೋಳೆ, ಉರುಳಿ, ಹುಟ್ಟುಕು, ಸಜ್ಜಿ ತೋಗೂರಿ, ಹಾರಕೆ, ಸಾಮೆ ಮತ್ತಿತರ ಧಾನ್ಯಗಳನ್ನು ಬೆಳೆಸುವುದನ್ನು ಮರತಿದ್ದಾರೆ. ಆದ್ದರಿಂದ ಇನ್ನಾವುದೂ ರೈತರು ಹಳೆಯ ಧಾನ್ಯಗಳನ್ನು ಕೆಲವು ಹೊಲಗಳ ಆಕೃತಿ ಸಾಲುಗಳಲ್ಲಿ ಬೆಳೆಸುವ ಪೂಜೇನಹಳ್ಳಿ-ಅರಣ್ಯ ಗೌಡನಹಳ್ಳಿಯ ರೈತ ಮೂಲಿಕೆಯರಿಗೆ ಮಾರ್ಗ ಸಂಸ್ಥೆಯವರು ಆಕೃತಿ ಸಾಲುಗಳ ಬೀಜಗಳನ್ನು ವಿತರಿಸಿದರು. ಮೂಲಕ ವ್ಯವಸಾಯದ ಗತ ವೈಲಮರಳೆ ತರಬೇತೆಗಾಗಿ ಎಂದು ತಿಳಿಸಿದರು. ಬೀಜಗಳನ್ನು ಮರತರೆ ಮತ್ತೊಂದು ದಿನ ನಮ್ಮ ದೇಶೀಯ ಧಾನ್ಯಗಳನ್ನು ಕೇವಲ ಮಧ್ಯ ಸಂಗ್ರಹಾಲಯಗಳಲ್ಲಿ ನೋಡಬೇಕಾಗುತ್ತದೆ ಎಂದು ಆತಂಕ ವ್ಯಕ್ತಪಡಿಸಿದರು.

ಬೈರಕೋಡು ಗ್ರಾಮ.ಪಂ ಅಧ್ಯಕ್ಷ ಬಿ. ಜ್ಞಾನವತಿ, ಆರ್.ಆರ್.ಎ ಸೆಕ್ರೆಟರ್ ಫಣೀಶ್, ಅರವ್ವೆ ಪ್ರಧಾಕರ್, ಗ್ರಾ.ಪಂ ಸದಸ್ಯ ರಾಮವ್ವ ಚೇತನ ಕುಮಾರ್, ರಾಜೇಂದ್ರಕುಮಾರ್, ಬೈರಕೋಡು ರೈತ ಸಂಘದ ಕೇಂದ್ರದ ಸುರೇಶ್ ಮುಂತಾದವರು ಇದ್ದರು.

An event to revive locally extinct seed varieties in the IBBN - Maarga field program in a village in Kolar, a rainfed district in Karnataka. IBBN also promotes integrated farming systems in villages with a focus on efficient use of bioresources and Biochar application.

A PLANNING WORKSHOP

**IMPROVED LIVELIHOODS IN
RAINFED AREAS THROUGH
SUSTAINABLE AGRICULTURE**



10:30 am to 4 pm

**28 th May 2022,
Saturday**

**JP Hall, Gandhi Bhavan,
Bengaluru**

Discussion panels

- Situation of rainfed land, and farmers in Karnataka
- Local innovations in rainfed areas
- Role of the Panchayats, farmer producer organizations, and extensions services in improving Rainfed agriculture
- Interventions by Civil Society organizations

