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SAFAR 1.0: Slag And Fly ash based green products for Acid soil Reclamation

[A journey from waste to wealth]

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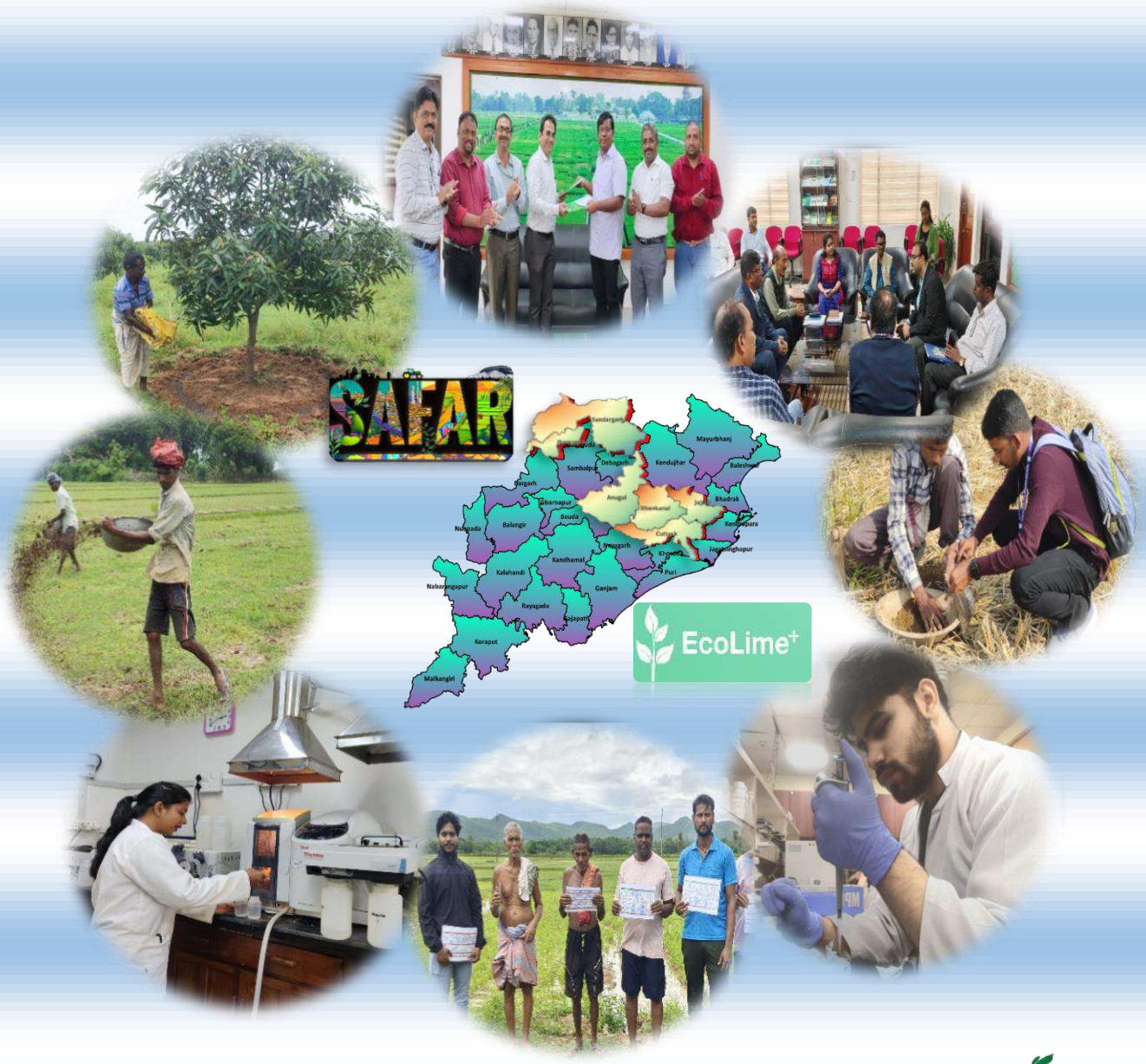

SAFAR Project

Funded by Government of Odisha

ICAR-Central Rice Research Institute
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Foreword

Soil acidity poses a significant challenge to agricultural productivity, particularly in regions like Odisha, where vast areas of cultivated land are affected by soil acidity. The adverse effects of soil acidity include nutrient deficiencies, reduced crop yields, and long-term soil degradation, making it imperative to adopt innovative and sustainable solutions for soil management.

The SAFAR project, as documented in this research bulletin, presents an eco-friendly approach for addressing soil acidity through the utilization of industrial by-products such as basic slag and fly ash, combined with compost. This "Waste to Wealth" initiative transforms industrial by products into valuable soil amendments; contributing to both environmental sustainability and enhances agricultural productivity. The development and optimization of EcoLime^{+}, a novel soil amendment, mark a significant step toward reclaiming acidic soils in Odisha and beyond.

Through meticulous research, field trials, and farmer-centric interventions, the SAFAR project has demonstrated tangible improvements in soil pH, nutrient availability, and crop yields. The collaboration between researchers, industries, start-ups, and farming communities underscores the importance of integrated efforts in tackling soil degradation and promoting sustainable agricultural practices.

This bulletin serves as a valuable resource for policymakers, researchers, and farmers, providing comprehensive insights into innovative soil management strategies. I am confident that the knowledge shared in this publication will inspire further research, policy support, and grassroots initiatives aimed at improving soil health and ensuring food security.

I commend the efforts of all stakeholders involved in this endeavour and encourage continued exploration of sustainable solutions for enhancing agricultural resilience.

Director

(ICAR-CRRI, Cuttack)

Preface

Soil acidity is a challenge affecting crop production in various regions worldwide, including India. In Odisha, acidic soils exist in a large portion (around 70%) of the cultivated land, leading to low nutrient availability and hampered crop productivity. This research bulletin presents the strategies and findings undertaken under the SAFAR (slag and fly ash based green products for acid soil management) project, aimed at managing soil acidity through sustainable and cost-effective soil amendments. The SAFAR project focuses on utilizing industrial by-products such as basic slag and fly ash, combined with compost, to manage/reclaim acidic soils in Odisha. This "Waste to Wealth" approach not only provides a solution for soil acidity but also promotes the environmentally friendly utilization of industrial waste, contributing to a circular economy. The bulletin details with the project's implementation across six districts in Odisha, highlighting the selection of study locations, soil characteristics, and constraints. It outlines the development and optimization of **EcoLime^{+}**, a value-added product formulated from basic slag/fly ash, and compost to neutralize soil acidity and improve crop production. Through extensive field trials and farmer training programs, the project has demonstrated significant improvements in soil pH, nutrient status, soil health and crop yield. The findings confirm the effectiveness of **EcoLime^{+}** in real farming conditions, offering a practical and scalable solution for acid soil management.

This bulletin serves as a comprehensive resource for researchers, policymakers, and farmers, providing insights into the project's methodology, results, and future directions. It underscores the importance of collaborative efforts between state government, research institute, industries, startups, FPOs and farmers in achieving sustainable agricultural practices and enhancing livelihood security in acidic soil regions. We hope this bulletin will inspire further research, policy decision and initiatives to improve soil health and promote sustainable agriculture in Odisha, as well as across India and beyond.

Authors

Acknowledgement

We extend our sincere gratitude to all the esteemed contributors who played a pivotal role in various stages of SAFAR project including its formulation, implementation and execution. We acknowledgement the partnership of all the stakeholders for preparation and distribution of basic slag/fly ash based value-added products (**EcoLime**$^{+}$) to the farmer's field of selected six districts of Odisha for management of acid soils. We express our deep gratitude to the State Government of Odisha for its generous funding for the SAFAR project under the Innovative Project Scheme. We deeply appreciate the Steel Industries, M/s Tata steel Ltd. Meramandali for supplying fly-ash and basic slag materials to Dhenkanal and Angul districts; Vedanta limited Jharsuguda for supplying fly-ash materials to Jharsuguda; Tata Steel Kalinganagar for supplying basic slag to Cuttack and Jajpur districts; and SAIL Rourkela, for their generous supply of basic slag and fly ash to Sundargarh district which were crucial for **EcoLime**$^{+}$ production for the farmers' fields. Our heartfelt thanks to the start-ups and company, RM Agrico Pvt. Ltd. for producing bulk amount of **EcoLime**$^{+}$ and helping distribution in Dhenkanal and Angul districts; Biotez Agrinovation Pvt. Ltd. for its active involvement in production and distribution of **EcoLime**$^{+}$ in the farmer's field of Sundargarh district; Smart Farming, and Ecogrow Solutions, for their commitment in preparing the **EcoLime**$^{+}$ for Cuttack, Jajpur and Dhenkanal districts, respectively. We acknowledge the invaluable role of FPO/FPCs, such as Cuttack 4s4r Seed Farmer Producer Company Limited and Sree Suklambar Farmers Producer Company for their active participation in distributing **EcoLime**$^{+}$ to farmers of Cuttack and Angul district, respectively. Special thank is due to line departments and KVKs of the Government of Odisha for their active participation and co-operation in awareness and demonstration programs, and the State Pollution Control Board, Odisha for granting necessary clearances to the steel industries for providing the raw materials (basic slag/ fly-ash) for preparation of **EcoLime**$^{+}$. We also express our sincere gratitude to the farmers of Cuttack, Dhenkanal, Jajpur, Angul, Sundargarh and Jharsuguda districts of Odisha for their enthusiasm in adopting and applying **EcoLime**$^{+}$ in their field, participating in field demonstrations and training programs.

Authors

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1. Introduction

1.1 Extent and problems of acid soils in Odisha and in India

Soil acidity poses a significant challenge to crop production across various regions worldwide, including India. In India, acidic soils are predominantly found in the humid South-western, Eastern, North-eastern, and Himalayan regions. Strongly acidic soils occupied 6.24 million hectares (1.9%), while moderately acidic soils cover 24.41 million hectares (7.4%) of the nation's total land area (Maji et al., 2012). The primary constraints related to acidic soils (Table 1) include yield reduction, nutrient imbalances, toxic effects and decreased microbial activities. Soil acidity leads to the toxicity of aluminium (Al) and manganese (Mn), while also limiting the availability of essential nutrients such as calcium, magnesium, phosphorus, nitrogen, boron, and molybdenum. Additionally, it hampers biological processes in the rhizosphere, particularly the symbiotic relationships between plants and beneficial organisms (Thakuria et al. 2016).

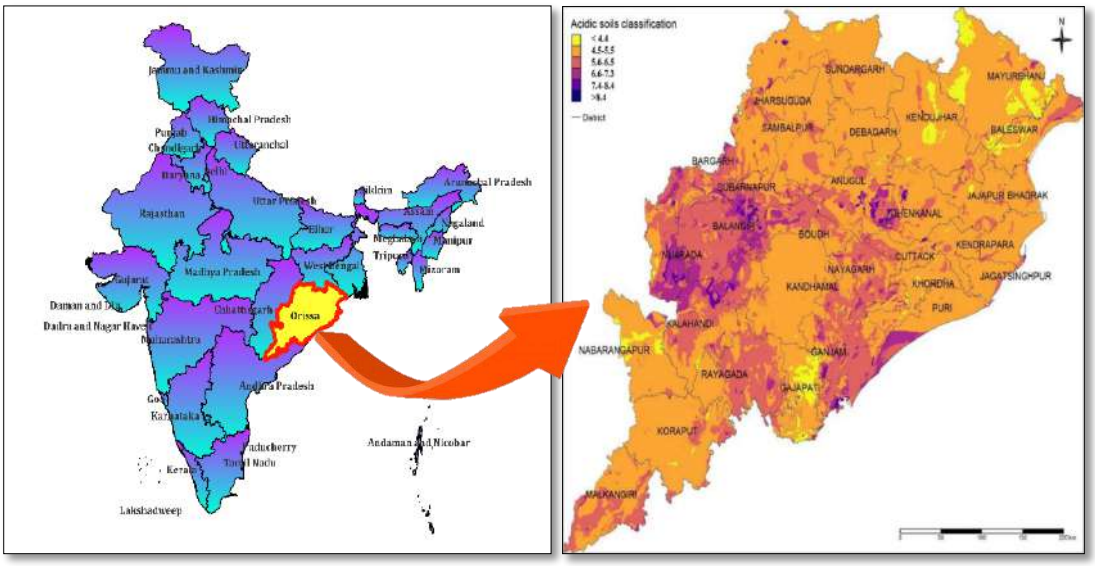


Fig.1. Spatial extent of acidic soil in Odisha (Dixit et al., 2020)

In Odisha, soil acidity severely impacts a large portion of the cultivated land, affecting around 70% (8.67 million hectares) of the total area of the state. Mostly rice crop is grown in these acidic soils of Odisha. Due to soil acidity the nutrient availability to the crop becomes less which significantly hampers the crop productivity. This has led to an estimated yield gap of 20-30% for rice grown in those acidic soils of Odisha. Farmers in those areas of Odisha face challenges in terms of poor income and declining livelihood security.

1.2 Need for sustainable and cost-effective soil amendments for acid soil management.

Generally, lime (CaO), Calcite ($CaCO_3$) and dolomite [$CaMg(CO_3)_2$] are the primary materials used for improving the quality of acid soils in Odisha. The total estimated demand for these liming materials in Odisha is approximately 3,262,500 tonnes. However, despite a total production of dolomite and limestone amounting to 8,614,191 tonnes (Department of steel and mines, Government of Odisha 2022) the significant demand for dolomite and limestone in other sectors such as construction, iron and steel, and chemical industries (accounting for 90% of the demand) limiting their availability for agricultural purposes to around 5.5% only. Consequently, within

the agricultural sector, the majority of dolomite and limestone are utilized for fertilizer production, leaving a limited amount for acid soils amelioration purposes. The high cost of liming materials and the limited availability of appropriate soil amendments for the reclamation of acid soils are the primary constraints preventing farmers in Odisha from managing their acidic soils. This underscores the urgent need for sustainable and cost-effective soil amendments to effectively reclaim/manage the acidic soils of Odisha, offering farmer's viable solutions for long-term agricultural sustainability.

1.3 Role of basic slag and fly ash in acid soil reclamation

In India, the steel industry alone produces around 12 million tonnes (MT) of basic slag annually. Odisha, contributing 4.2 MT (25%), is a significant contributor to this production (Indian Minerals Yearbook, May 2021). Additionally, thermal power plants in Odisha generate around 150 million tonnes (MT) of fly ash per year (Ministry of Power, GoI 2021).

Currently, a substantial amount of basic slag and fly ash is under-utilized and often dumped in yards of production units. Unfortunately, this leads to environmental pollution. However, it's important to note that both basic slag and fly ash possess alkaline properties, making them effective resources for reclaiming acid soils.

Typical composition of basic slag (particularly LD slag) in India includes approximately 48-50% calcium oxide (CaO), 11-13% silicon dioxide (SiO_2), 8-15% magnesium oxide (MgO), 5-10% iron oxide (FeO), 1-5% phosphorus pentoxide (P_2O_5), 1-5% manganese oxide (MnO), 1-3% aluminum oxide (Al_2O_3), 0.5-3% sulfur (S), and trace elements (such as chromium, and nickel) less than 1%. The composition of fly ash can vary, but the typical composition of fly ash in India includes approximately 45-55% silicon dioxide (SiO_2), 15-30% aluminum oxide (Al_2O_3), 5-15% iron oxide (Fe_2O_3), 3-8% calcium oxide (CaO), 0.5-5% magnesium oxide (MgO), 1-3% sulfur trioxide (SO_3), and trace elements such as chromium, nickel and titanium less than 1%.

The alkaline nature and composition of basic slag and fly ash, including lime (CaO), silicic acid (SiO_2), phosphorus pentoxide (P_2O_5), magnesia (MgO), manganese (Mn), and iron (Fe), make them suitable for reclaming acidic soils. These properties of the slag / fly ash can be effectively utilized to ameliorate the acid soils.

1.4 Project overview and objectives

SAFAR project aims at value addition to basic slag and fly ash with addition of compost and subsequent field application of the value-added products for management of acid soils in the targeted blocks of six districts in Odisha on pilot basis.

The project is based on "Triple-Win" approach, aiming to achieve three benefits:

- **First win**: By utilizing basic slag and fly ash: aimed to reclaim acidic soils, which is a problematic soil and a significant factor contributing to poor rice yields. This approach has the potential to improve rice productivity by approximately 20%.
- **Second win**: The focus was on the environment friendly utilization of basic slag and fly ash. These materials, if improperly disposed-of, could lead to soil, air and water pollution. However, by effectively utilizing those, could mitigate the pollution.
- **Third win**: By incorporating value-added basic slag/fly ash products agriculture; aim to sustain productivity while simultaneously reducing greenhouse gases (GHGs) emissions and mitigating climate change.

The objectives of the project:

- Characterization of basic slag/fly ash, and development of their value-added products and validating them in acid soils both at experimental and farmers' fields.
- Techno-economical evaluation of basic slag/fly ash-based value-added products and technologies as soil amendment to reclaim acid soils in Odisha.
- Capacity building, and promotion of developed products and technologies through FPOs and start-ups for sustainability.

2. Study area, implementation plan and project model

Six districts of the state of Odisha where soil acidity is a major problem, namely Cuttack, Jajpur, Sundargarh, Dhenkanal, Angul, and Jharsuguda were selected in the project. In each district about 3-5 blocks were selected for implementation of the project. Major crops grown in these study area is rice and soils are mainly acidic in nature. The percentage area under rice cultivation out of the total cultivated area in those districts during kharif varies from 52% for Cuttack, 81% for Jajpur, 75% for Sundargarh, 48% for Dhenkanal, 32% for Angul and 46% for Jharsuguda (Directorate of Agriculture, Odisha, 2020).

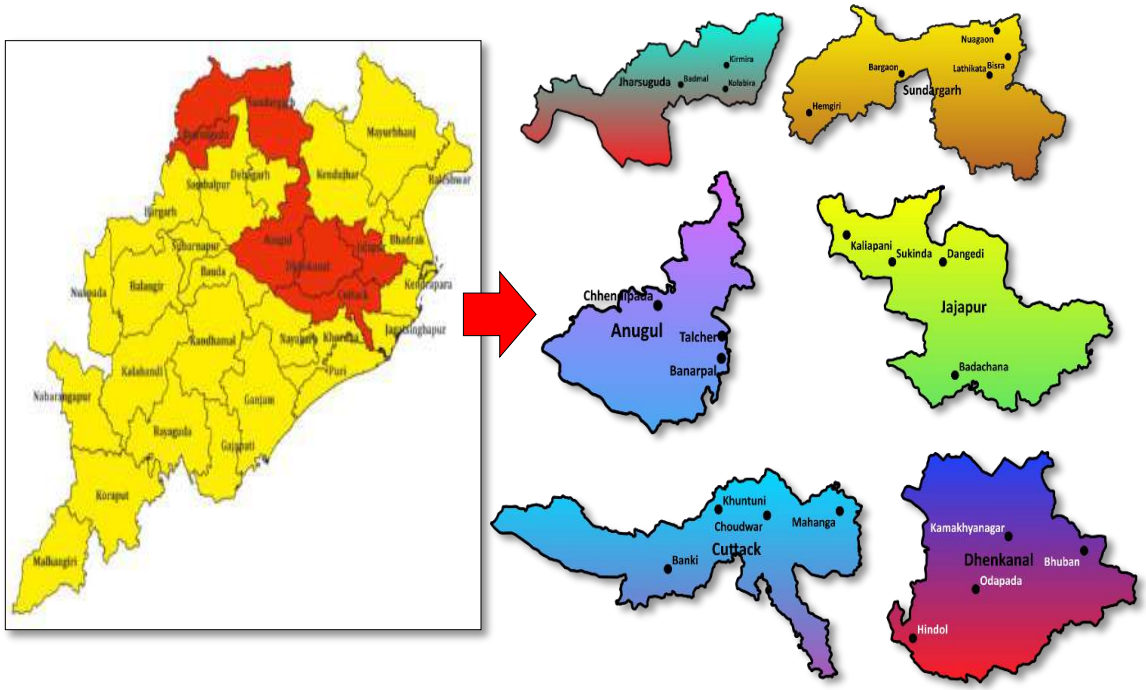


Fig. 2. Odisha map with study districts and blocks

2.1 Soil characteristics and constraints

The soils of the selected districts are acidic in nature. Description of selected districts Cuttack, Jajpur, Sundargarh, Dhenkanal, Angul, Jharsuguda are given in table below (Table 1).

Table 1. Soil characteristics and constraints for crop production in selected study districts

District Name	Description of district	Major constraints to crop production
Cuttack	Cuttack district is situated in the mid-eastern part of Odisha. The soils are acidic in reaction and moderately eroded. Soil pH range for different blocks of Cuttack are Athagarh: 4.25-6.27, Badamba: 4.92-8.04, Banki: 4.26 – 6.77, Banki – Dampara: 4.77-5.33, Barang: 4.55-6.65, Cuttack-Sadar: 4.64-6.66, Kantapada: 4.80-6.94, Mahanga: 4.74-6.37, Niali: 4.42-6.49, Nischintakoili: 4.94-7.11, Salepur: 4.71-6.68, Tangi-Choudwar: 4.64-6.09, and Tigiria: 4.88- 7.48. (Mishra *et al*., 2013). **Major crops grown:** Rice, pulses, oil seeds, jute, sugarcane, coconut and turmeric.	Soil acidity, lower availability of plant nutrients, less crop productivity
Jajpur	Block wise pH ranges for Jajpur district are, Sukinda: 4.09–6.83, Danagadi: 4.40–7.40, Korei: 4.43–7.23, Dasarathpur: 4.82–6.92, Badachana: 4.59–6.49, Dharmasala: 4.38–6.62, Rasulpur: 4.34–6.74, Binjharpur: 4.86–5.91, Jajpur: 4.64–6.97, Bari: 4.44–7.40, and Jajpur district: 4.09–7.40. The pH of Jajpur district vary from 4.09-7.40 (Nayak *et al*, 2022). **Major crops grown:** Rice is traditionally grown in two well defined seasons, namely kharif and rabi. Of these two, kharif (rainy) is the most important rice season. Other crops like pulses, oil seeds, jute, sugarcane, coconut and turmeric etc.	A significant portion of the surface soil exhibits acidic pH posing constraints for crop production; especially plant nutrient availability; reliance on rainfed agriculture leading to vulnerability to droughts and floods; and the need for improved irrigation infrastructure and water management techniques.
Sundargarh	The pH of the soil of Sundargarh district varies from 5.5 to 6.9. Out of the total cultivated land in this district, 52 percent is upland, 30 percent is mediumland and 18 percent is lowland. **Major crops grown:** Rice is the main crop. About 75 percent of the land is covered with paddy during kharif. Other	Soil acidity and nutrient deficiencies (nitrogen, phosphorus, potassium); and limited irrigation are the main constraints for crop production.

	crops like pulses, mango, guava, coconut and lemon etc.	
Dhenkanal	The soil pH in Dhenkanal district, Odisha, generally ranges from 4.33 to 7.83, indicating that the soils are acidic to saline. Soil pH in Odapada block and Hindol block varies from 4.52-7.83 and 4.68-7.72, respectively. **Major crops grown:** Rice, ground nut, cashew nut, potato, mango, jackfruit, sugarcane and some vegetables.	Most blocks exhibiting acidic conditions limiting crop productivity; water scarcity, especially during the rabi season.
Angul	In Angul district, Odisha, soil pH generally ranges between 4.0 and 7.8. **Major crops grown:** Rice, pulses, vegetables, spices, groundnut, mango and cashew.	Acidic soil; inadequate irrigation; natural calamities like drought and floods
Jharsuguda	Soil pH varies from 4.3-6.7 in this district. The soil pH ranges for different blocks of the district are, Jharsuguda: 4.4 to 6.6; Kirmira: 4.3 to 6.4; Kolabira: 4.5 to 6.7; Laikera: 4.5 to 6.6; and Lakhanpur: 4.4 to 6.7 (Jena *et al*, 2023). **Major crops grown:** Rice, sugarcane, groundnut, mango, coconut, cashew and lemon.	Acid soils low nutrient availability.

2.2 Criteria for selecting study locations

The locations having acidic soils were carefully chosen based on their proximity to steel industries, which serve as key sources of basic slag/fly ash, ensuring a steady supply of raw materials for soil amendment. Additionally, the presence of Farmer Producer Organizations (FPOs) and innovative startups in those regions played a crucial role in supporting the development, production, and efficient distribution of value-added products. Most importantly, all the selected districts are characterized by acidic soil conditions, making them ideal for evaluating the effectiveness of basic slag/fly-ash based value-added products in acid soil reclamation and agricultural improvement.

2.3 SAFAR Model

The components of SAFAR model are Industries, Start-ups, Institutions (ICAR-CRRI, Odisha state Govt., KVKs), FPOs and the Farmers. Under this model the potential raw materials (basic slag/ fly-ash) suppliers (the steel industries) were selected based on the nearest distance from study area; the start-ups were selected so as to prepare the final products and the FPOs were chosen to reach out to the farmer's field with the value-added products for field applications (Fig.3). All the scientific inputs for standardization of value-added products and providing trainings to farmers are being carried out by ICAR-CRRI, Cuttack and its associated KVK at Santhapur, Cuttack.

Govt. of Odisha provided financial support and regular suggestions for research and development.

The value-added products that have been developed with the compatible mixture of 'compost + basic slag and or fly ash' are used as soil amendment that could reclaim soil acidity, improves nutrient status and ultimately crop yield.

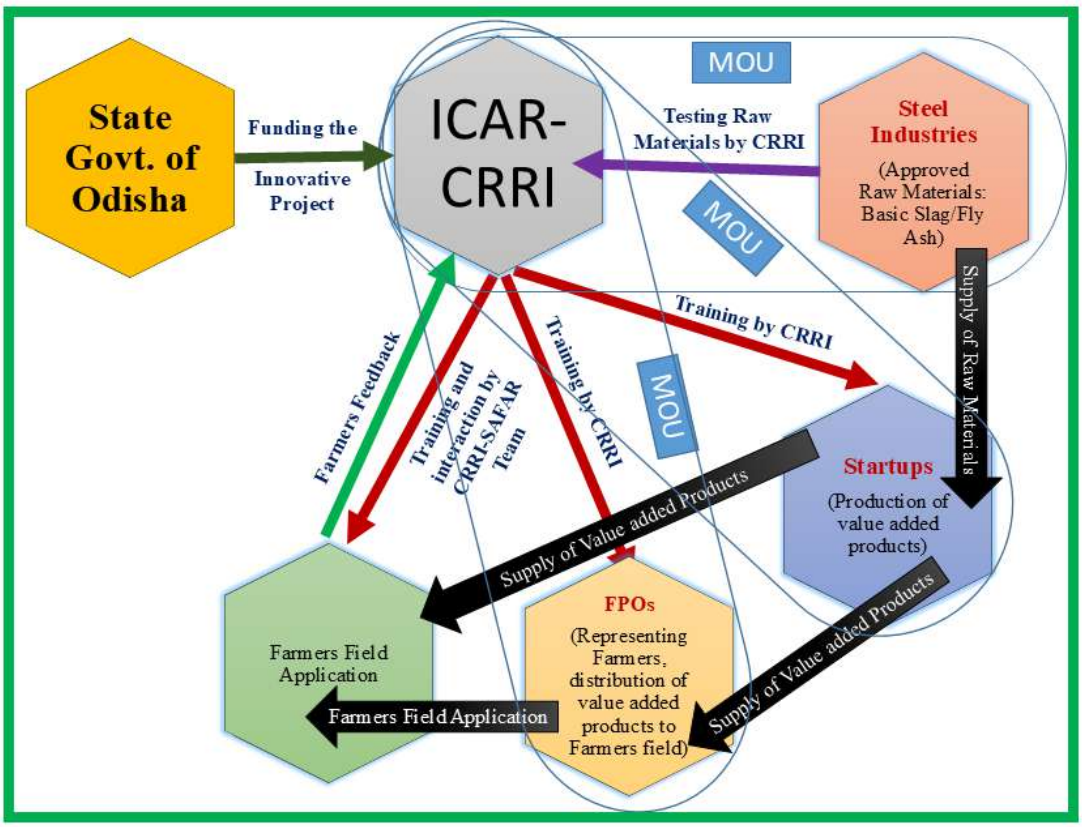


Fig. 3. The conceptual SAFAR Model

2.4 Selection of start-ups, FPOs and Industries

Potential start-up's were selected following due procedures by competent committee. The required criteria for selection of the potential entrepreneurs were for production of the value-added products were:

- Potential entrepreneurs should have knowledge on production of compost, soil amendments or organic manure.
- Potential entrepreneurs should have the experience on the preparation of compost, soil amendments, rice straw utilization and waste management.
- Potential entrepreneurs should be working in Odisha and registered in MSME.

To identify the best candidates, advertisements were done in leading newspapers and on the official website of ICAR-CRRI. Based on committee recommendations, EcoGrow Solutions (Odapada, Dhenkanal), Biotez: Agrinovation (Rourkela), and Smart Farming (Bhubaneswar) were selected as key startups for the production of basic slag and fly ash-based value-added products. As the project progressed towards product commercialization; license was given to RM Agrico Pvt. Ltd., Dhenkanal for large-scale production and market distribution.

For the supply of raw materials, several steel, thermal, and power industries were approached, and partnerships were established based on mutual interest and material

availability. Among them, Tata Steel (Meramandali), Tata Steel (Kalinga Nagar), SAIL (Rourkela), and Vedanta Pvt. Ltd. (Jharsuguda) were contributed significantly as the primary suppliers of basic slag/fly ash.

To ensure the smooth execution of the project, formal Memorandums of Understanding (MoUs) were signed with all associated startups, and companies establishing clear roles and responsibilities for efficient collaboration, production, and distribution of basic slag/ fly ash -based value-added soil products (Annexure I).

Fig. 4. Signing MoU's with the startups

Table 2. Various contributors in SAFAR project

Name of the Institute/Organization/Industry	Location	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Contribution
Steel Industry				
M/s Tata Steel Ltd.	Meramandali, Dhenkanal	20.796	85.257	Supply of basic slag/fly ash for preparation of soil amendment in Dhenkanal and Angul districts
Vedanta Ltd.	Jharsuguda	21.788	84.054	Supply of fly ash for preparation of soil amendment in Jhasrsuguda districts

Tata Steel, Kalinganagar	Jajpur	20.976	86.005	Supply of basic slag for preparation of soil amendment in Cuttack and Jajpur districts
SAIL, Rourkela	Rourkela	22.220	84.860	Providing fly ash/basic slag for preparation of soil amendment in Sundargarh district
Start-ups				
Biotez Agrinovation Pvt. Ltd.	NIT, Rourkela	22.255	84.903	Preparation and supply of soil amendment for Sundargarh & Jharsuguda districts.
RM Agrico Pvt. Ltd.	Dhenkanal	20.590	85.663	Preparation and supply of soil amendment for Dhenkanal, Cuttack, Jajpur and Angul districts.
Smart Farming	Kalinganagar, Bhubaneswar	20.269	85.762	Preparation and supply of soil amendment for Cuttack and Jajpur district
Ecogrow Solutions	Dhenkanal	20.662	85.594	Preparation and supply of soil amendment for Dhenkanal district
FPO/FPCs				
Cuttack 4S4R Seed Farmer Producer Company Limited	Cuttack	20.481	86.118	Helping distribution of soil amendment in the farmers field of Cuttack and Jajpur district
Sree Sukhlambhar Farmers Producers Company	Angul	21.130	84.913	Active contributions in distributing soil amendment in Angul district
Other Institutions/ Organizations				
Line departments, including KVKs, Gov. of Odisha				Helping in awareness-cum-demonstration program
State Pollution Control Board, Odisha				Giving clearance to steel industries for

	supplying basic slag/ fly-ash materials
Farmers of six districts	Application of soil amendment in their field, participation in field demonstrations and training programs.
State Govt. of Odisha	For Funding the SAFAR project under Innovative Project Scheme.

3. *Development of EcoLime⁺ (basic slag/fly ash based value-added products)*

The development of basic slag/ fly ash based value-added soil amendments (**EcoLime+**) under the SAFAR project involved a systematic approach to formulating optimal blends of basic slag/fly ash, and compost. The aim was to create the value-added products that effectively neutralizes soil acidity, improves nutrient availability, reduce GHG emissions and maintains soil health while ensuring environmental safety.

3.1 Selection of raw materials for EcoLime⁺

Samples of basic slag and fly ash were collected from selected industries in Odisha, including steel and thermal power plants (Table 3). The slag materials varied in color and particle size. These samples were analyzed for pH, CaO, MgO, SiO_2, Fe content, and heavy metals concentrations to ensure compliance with safety standards. Compost plays a crucial role in enhancing the efficiency of basic slag and fly ash-based soil amendments by improving nutrient availability, dilute heavy metals concentrations and reducing their bioavailability. Additionally, compost enriches the soil with organic carbon, nitrogen, phosphorus, and essential micronutrients while promoting microbial activity for better nutrient cycling, root development and yield. By integrating compost into the formulation, **EcoLime⁺** not only neutralizes soil acidity but also improves soil health and crop productivity. To ensure the suitability of raw materials for soil application, strict selection criteria were set:

- **Basic Slag:** Should have a pH above 8.0, CaO content between 40-50%, MgO between 8-15%, and Fe content below 45%. Heavy metal content (Cr, Pb, Cd) must be below the permissible limits set by EU standards (2002). (Table 3a)
- **Fly Ash:** Pond ash is more suitable. It should have a pH above 8.0, SiO_2 content between 40-55%, and CaO between 3-8%, with heavy metal content below permissible limits. (Table 3b)
- **Compost:** Used to dilute heavy metals concentration, improve nutrient content, and enhance microbial activities. Selection criteria included C:N ratio $\leqslant$ 20:1, moisture content $\leqslant$ 25%, and nitrogen content $\geqslant$ 0.5% (Table 3C).

3.2 EcoLime⁺: Product Development and Optimization

Different formulations were tested by mixing basic slag, compost, and fly ash in varying ratios under controlled moisture conditions for three months. Throughout this period, regular monitoring of key parameters such as pH heavy metals contents etc. were

conducted at periodic intervals (5-7 days' interval) to ensure the effectiveness and safety of the products. Moisture levels were carefully adjusted to maintain consistency in the product formulation and to facilitate the desired chemical reactions that enhance soil amendment properties. The final blends were screened based on their efficiency to neutralize the soil acidity (liming potential/CCE) and lower heavy metal concentrations within permissible limits. After extensive laboratory trials and field evaluations, the optimized formulation was developed and branded as **EcoLime**$^{+}$, a specialized product tailored for acid soil management. The final characteristics of **EcoLime**$^{+}$ were thoroughly evaluated to ensure compliance with the required physical, chemical, and environmental safety standards before application, making it a scientifically validated and sustainable solution for improving soil health in acidic regions (Table 3).

Fig. 5. Different size and color of basic slag

Table 3. Criteria for selection of raw materials

3A. Basic Slag

Parameter	Range/Value	Comments
Size of the particles (mm)	< 3	Easy mix-up with soil components
pH	≥ 8.0	Must be Alkaline
Fe Content (%)	<45	Should be in range
MgO (%)	≥8	Should be in range
CaO (%)	≥40	Should be in range
SiO_2 (%)	≥10	Should be in range
Cr (Threshold, ppm)	<110	Must be Below Safe limit (EU, 2002)
Pb (Threshold, ppm)	<300	Must be Below Safe limit (EU, 2002)
Cd (Threshold, ppm)	< 3.0	Must be Below Safe limit (EU, 2002)

3B. Fly ash

Parameter	Range/Value	Comments
Type of fly ash	Pond ash	Should be Pond ash
pH	≥ 8.0	Must be Alkaline
Fe Content (%)	< 20	Should be in range
MgO (%)	≥0.5	Should be in range
CaO (%)	≥3	Should be in range
SiO_2 (%)	≥40	Should be in range
Cr (Threshold, ppm)	<150	Must be Below Safe limit (EU, 2002)
Pb (Threshold, ppm)	<300	Must be Below Safe limit (EU, 2002)
Cd (Threshold, ppm)	<3.0	Must be Below Safe limit (EU, 2002)

3C. Compost

Range/Value	Range/Value	Comments
C:N ratio	≤ 20:1	Should be in range
Moisture Content (%)	≤ 25	Should be in range
N Content (%)	≥ 0.5	On dry weight basis

Table 4. Product Quality Parameters should be maintained before Application of EcoLime^{+}

Parameter	Range/Value	Comments
Mess Size	>80% should pass through 20 mess and >20% should pass 100 mess	Easy mix-up with soil components
pH	≥ 8.0	Must be Alkaline
CCE (%)	>60	Good liming potential
N Content (%)	≥ 0.5	On dry weight basis
Fe Content (%)	5-45	Should be in range
MgO (%)	6-20	Should be in range
CaO (%)	10-60	Should be in range
SiO_2 (%)	5-60	Should be in range
Cr (ppm)	<150	Must be Below Safe limit (EU, 2002)
Pb (ppm)	< 300	Must be Below Safe limit (EU, 2002)
Cd (ppm)	< 3.0	Must be Below Safe limit (EU, 2002)
Moisture Content (%)	10-40	Weight by weight basis

4. Regulatory approvals

The large-scale supply of basic slag and fly ash-based value-added products as soil amendments and subsequent use in agriculture for research and development purpose required comprehensive regulatory approvals from State Pollution Control Board and consent from industries and farmers. To facilitate this, approvals from regulatory bodies, agreements with industries, and engagement with startups and landowners were systematically secured (Annexure II).

4.1 Pollution Control Board Clearance for industries to supply basic slag and fly ash

One of the most critical regulatory milestones in this project was obtaining official clearance from the State Pollution Control Board (SPCB), Odisha, for the supply and use of fly ash and basic slag-based value-added product for research and development purposes in agricultural applications. This clearance was necessary to ensure the smooth supply of these raw materials from the respective industries. After extensive documentation and official meetings, SPCB issued the formal clearance certificate on April 20, 2024, permitting the supply of fly ash (FA) and basic slag (BS) from Aarati Steel, Vedanta Ltd., SAIL, Jindal Steel & Power Ltd. and Tata Steel (Annexure II). This approval validated that these materials could be safely supplied by the industries to the selected locations for production of basic slag/fly ash-based value-added products. This clearance not only facilitated access to industrial by-products but also provided scientific validation of their suitability for acid soil reclamation, ensuring acceptance by farmers and policymakers.

4.2 Agreements with the industry

To secure a consistent and high-quality supply of FA and BS for agriculture use, the project engaged in multiple rounds of discussions with key industries. Several meetings were conducted with industry representatives to formalize agreements and secure official approvals for the supply of these materials (Photo Plate No 1). Through these engagements, formal partnerships were established with Tata Steel, Meramandali; Tata steel, Kalinganagar; Vedanta Pvt. Ltd., Jharsuguda and SAIL, Rourkela ensuring that FA and BS would be made available in the required quantities for field trials and large-scale demonstration in agricultural purpose of different selected districts. The industries played a crucial role in supporting the project by:

- Providing regular supply of FA and BS as per the project's requirements.
- Maintaining material quality.
- Facilitating logistics to supply at designated sites.

The supply and transportation of FA and BS to the selected experimental locations commenced, allowing the initiation of large-scale field trials and validation of their value added product's efficacy in managing acid soils.

4.3 Consent from landowners and local authorities for mass deposition of raw materials

Given the large volume of FA and BS required for production of basic slag/ fly ash based value-added products, and field trials, the specific sites were identified (Table 5). To ensure smooth implementation, the necessary consents were obtained from landowners and approvals from local authorities. Obtaining landowner consent the mass deposition and storage of raw materials were done. The project team engaged with private landowners, village panchayats, and local governing bodies to secure formal consent for land utilization (Annexure II). These discussions focused on:

- Identifying suitable locations that limited the environmental impact; maintain a safe distance from residential areas; and avoid direct contact with surface water bodies such as rivers or ponds.
- Addressing issues related to land degradation and long-term sustainability.
- Obtaining clearance from local pollution control offices to ensure adherence to environmental safety norms (Fig. 6).

Through proactive stakeholder engagement, approvals were successfully obtained, enabling safe deposition, handling, and utilization of fly ash/basic slag based value added products.

Table 5. Selected sites for the mass deposition of basic slag (B) and fly ash (FA)

Location (village, block)	Targeted District	Associated industries	Associated startups
Patrapali, Kolabira (21.81° N, 84.13°E)	Jharsuguda	Vedanta Pvt. Ltd. (Rourkela)	Biotez Agroinovation Pvt. Ltd.
Badashila, Samia (20.68° N, 85.99°E)	Jajpur	Tatasteel, Kalinganagar (Jajpur)	Smart Farming, RM Agrico Pvt. Ltd.
Kampasalajungle, Kaniha (21.14° N, 84.95°E)	Angul	Tatasteel, Meramadali (Dhenkanal)	Sree Sukhlambhar FPC Pvt. Ltd. (F.P.O)
KVK, Santhpur (20.59° N, 86.02° E)	Cuttack	Tatasteel, Kalinganagar (Jajpur)	Smart Farming, RM Agrico Pvt. Ltd., F.P.O

Odapada (20.65° N, 85.49°E)	Dhenkanal	Tatasteel, Meramadali (Dhenkanal)	Ecogrow Solution, RM Agrico Pvt. Ltd.
Suidihi, Lathikata (22.15° N, 84.85°E)	Sundargarh	SAIL (Rourkela)	Biotez Agroinovation Pvt. Ltd.

4.4 Engagement of startups for mass production of fly ash/basic slag-based value-added products (EcoLime+)

Recognizing the importance, scalability and sustainability, the project actively engaged the three startups and Farmer Producer Organizations (FPOs) to facilitate the mass production, packaging, and distribution of **EcoLime+**, the value-added product derived from FA and BS.

Startups played a key role in:

- Processing FA/BS into a standardized formulation, ensuring uniformity in particle size, moisture content, and composition.
- Arrangement of compost from locally available raw materials
- Establishing local production units to reduce transportation costs and promote decentralized manufacturing.

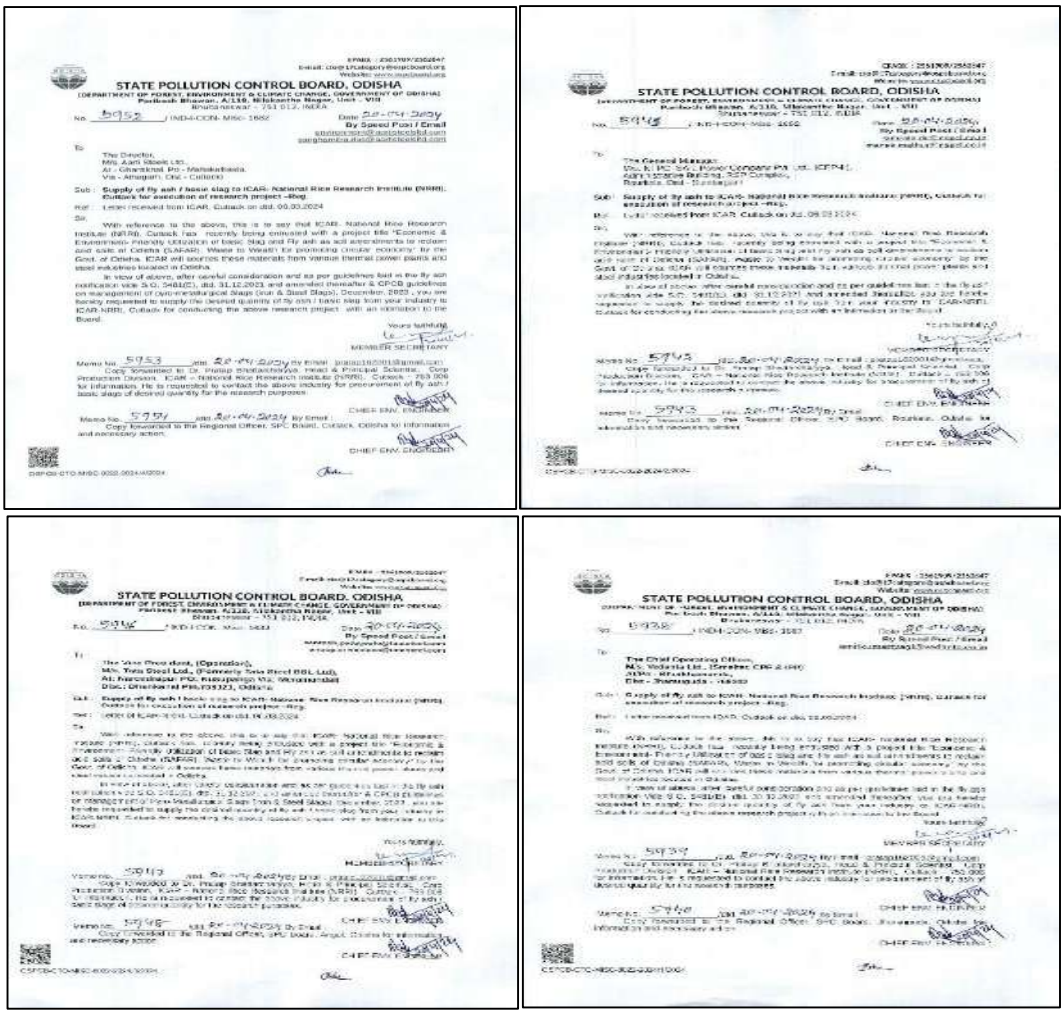
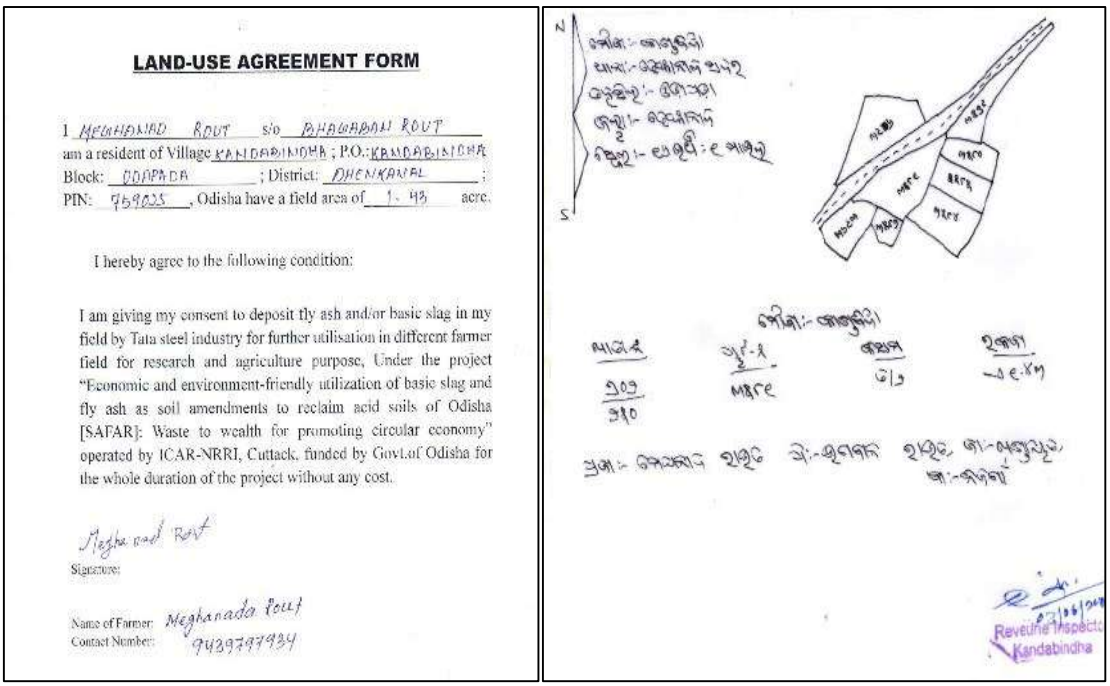


Fig.6. Clearance Certificates from State Pollution Control Board for the industries to supply basic slag and fly ash for agriculture use.

The integration of startups in the production process not only ensured wider adoption of **EcoLime**$^{+}$ but also created new business opportunities, promoting rural entrepreneurship and employment in Odisha. Through a well-structured approach involving regulatory approvals, industry partnerships and startup engagement the project successfully established a framework for the safe and efficient use of FA and BS-based value-added products in acid soil management.



LAND-USE AGREEMENT FORM

I MEGHANAD ROUT s/o PRAGYABANI ROUT
am a resident of Village KANDABINDHA ; P.O.:KANDABINDHA
Block: ODAPADA ; District: DHENKANAL ;
PIN: 759025 , Odisha have a field area of 1.45 acre.

I hereby agree to the following condition:

I am giving my consent to deposit fly ash and/or basic slag in my field by Tata steel industry for further utilisation in different farmer field for research and agriculture purpose, Under the project "Economic and environment-friendly utilization of basic slag and fly ash as soil amendments to reclaim acid soils of Odisha [SAFAR]: Waste to wealth for promoting circular economy" operated by ICAR-NRRI, Cuttack, funded by Govt.of Odisha for the whole duration of the project without any cost.

Megha nad Rout
Signature:

Name of Farmer: Meghanada Rout
Contact Number: 9439797934

Revenue Inspector
Kandabindha

Fig.7. Sample of the consent of owners of the lands deposition of FA and BS

5. Soil analysis, farmers' field selection, and mass production of basic slag /fly ash-based value-added products (EcoLime^{+})

Following the necessary regulatory clearances, the project team initiated systematic soil sampling and analysis across the selected districts to identify suitable sites for field trials. This phase also involved securing compost for mass production of the product.

5.1 Soil Sample collection and analysis and Soil Health Card preparation & distribution

Soil sampling was conducted in two phases: before commence of *kharif* 2024 and before commence of *rabi* 2024-25 to assess the baseline soil conditions across different districts. The project team collected surface soil samples (0-15 cm depth) from farmers' fields and analyzed them for essential soil parameters (Photo plate no. 2).

Phase 1

The first phase of soil sampling commenced in April 2024 and continued until June 2024, during which a total of 1,097 soil samples were collected from the selected districts. The samples were analyzed for all 12 critical parameters as prescribed by Government of India for soil health card which includes pH, nitrogen (N), phosphorous (P), potassium (K), organic carbon (OC), and micronutrient to evaluate soil health and determine the suitability of fields for trials. The Soil Health Cards (SHC) were prepared based on those results.

Table 6. Number of soil sample collected in phase 1 (July to November, 2023)

(details of locations and farmers' name present in the Annexure III)

Districts	Total no. of soil sample collected	Soil health card prepared	Soil health card distributed
Cuttack	180	180	180
Dhenkanal	217	217	217
Jajpur	250	250	250
Angul	200	200	200
Jharsuguda	300	300	300
Total	**1097**	**1097**	**1097**

Phase 2:

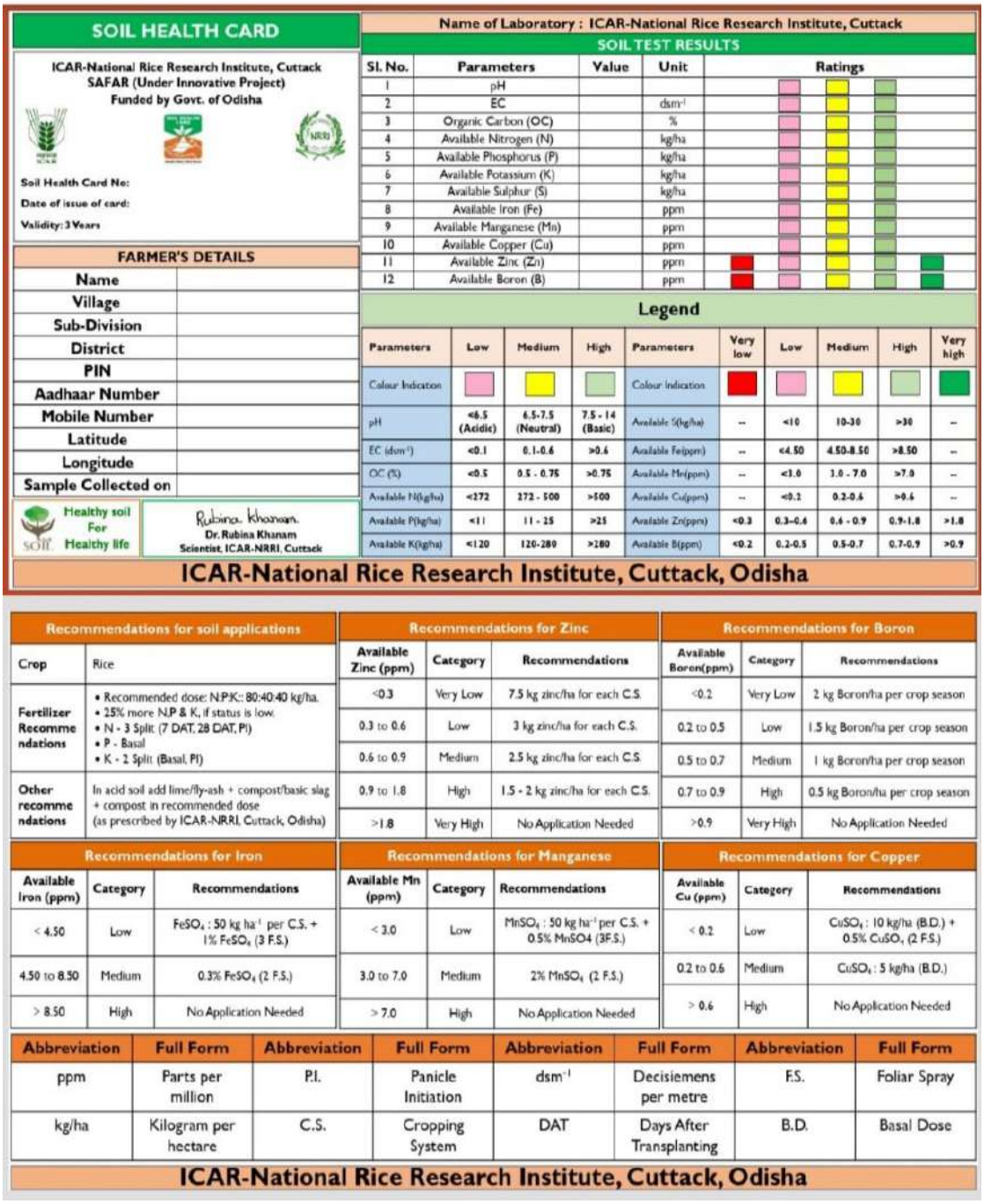
The second phase of soil sampling took place during commence of *rabi* season 2024-25, in which 106 additional soil samples were collected and analyzed.

Table 7. Number of soil sample collected in phase 2 (April-October, 2024)

(details of locations and farmers' name present in the annexure III)

Districts	Total no. of soil sample collected
Cuttack	40
Dhenkanal	08
Jajpur	02
Angul	24
Jharsuguda	12
Sundargarh	20
Total	**106**

All collected samples were analyzed for 12 key soil health parameters, and the Soil Health Cards (SHC) were prepared in bilingual format (English and Odia) with color-coded symbols, making them easily understandable for farmers. The soil health cards also include the field-specific recommendations to improve soil fertility and productivity (Fig 8).



SOIL HEALTH CARD

ICAR-National Rice Research Institute, Cuttack
SAFAR (Under Innovative Project)
Funded by Govt. of Odisha

Soil Health Card No:
Date of issue of card:
Validity: 3 Years

FARMER'S DETAILS

Name	
Village	
Sub-Division	
District	
PIN	
Aadhaar Number	
Mobile Number	
Latitude	
Longitude	
Sample Collected on	

Healthy soil For Healthy life

Rubina Khanam
Dr. Rubina Khanam
Scientist, ICAR-NRRI, Cuttack

Name of Laboratory : ICAR-National Rice Research Institute, Cuttack

SOIL TEST RESULTS

Sl. No.	Parameters	Value	Unit	Ratings
1	pH			
2	EC		dsm^{-1}	
3	Organic Carbon (OC)		%	
4	Available Nitrogen (N)		kg/ha	
5	Available Phosphorus (P)		kg/ha	
6	Available Potassium (K)		kg/ha	
7	Available Sulphur (S)		kg/ha	
8	Available Iron (Fe)		ppm	
9	Available Manganese (Mn)		ppm	
10	Available Copper (Cu)		ppm	
11	Available Zinc (Zn)		ppm	
12	Available Boron (B)		ppm	

Legend

Parameters	Low	Medium	High	Parameters	Very low	Low	Medium	High	Very high
Colour Indication				Colour Indication					
pH	<6.5 (Acidic)	6.5-7.5 (Neutral)	7.5 - 14 (Basic)	Available S(kg/ha)	--	<10	10-30	>30	--
EC (dsm^{-1})	<0.1	0.1-0.6	>0.6	Available Fe(ppm)	--	<4.50	4.50-8.50	>8.50	--
OC (%)	<0.5	0.5 - 0.75	>0.75	Available Mn(ppm)	--	<3.0	3.0 - 7.0	>7.0	--
Available N(kg/ha)	<272	272 - 500	>500	Available Cu(ppm)	--	<0.2	0.2-0.6	>0.6	--
Available P(kg/ha)	<11	11 - 25	>25	Available Zn(ppm)	<0.3	0.3-0.6	0.6 - 0.9	0.9-1.8	>1.8
Available K(kg/ha)	<120	120-280	>280	Available B(ppm)	<0.2	0.2-0.5	0.5-0.7	0.7-0.9	>0.9

ICAR-National Rice Research Institute, Cuttack, Odisha

Recommendations for soil applications

Crop	Rice
Fertilizer Recommendations	• Recommended dose: N:P:K:: 80:40:40 kg/ha. • 25% more N,P & K, if status is low. • N - 3 Split (7 DAT, 28 DAT, PI) • P - Basal • K - 2 Split (Basal, PI)
Other recommendations	In acid soil add lime/fly-ash + compost/basic slag + compost in recommended dose (as prescribed by ICAR-NRRI, Cuttack, Odisha)

Recommendations for Zinc

Available Zinc (ppm)	Category	Recommendations
<0.3	Very Low	7.5 kg zinc/ha for each C.S.
0.3 to 0.6	Low	3 kg zinc/ha for each C.S.
0.6 to 0.9	Medium	2.5 kg zinc/ha for each C.S.
0.9 to 1.8	High	1.5 - 2 kg zinc/ha for each C.S.
>1.8	Very High	No Application Needed

Recommendations for Boron

Available Boron(ppm)	Category	Recommendations
<0.2	Very Low	2 kg Boron/ha per crop season
0.2 to 0.5	Low	1.5 kg Boron/ha per crop season
0.5 to 0.7	Medium	1 kg Boron/ha per crop season
0.7 to 0.9	High	0.5 kg Boron/ha per crop season
>0.9	Very High	No Application Needed

Recommendations for Iron

Available Iron (ppm)	Category	Recommendations
< 4.50	Low	$FeSO_4$: 50 kg ha^{-1} per C.S. + 1% $FeSO_4$ (3 F.S.)
4.50 to 8.50	Medium	0.3% $FeSO_4$ (2 F.S.)
> 8.50	High	No Application Needed

Recommendations for Manganese

Available Mn (ppm)	Category	Recommendations
< 3.0	Low	$MnSO_4$: 50 kg ha^{-1} per C.S. + 0.5% MnSO4 (3F.S.)
3.0 to 7.0	Medium	2% $MnSO_4$ (2 F.S.)
> 7.0	High	No Application Needed

Recommendations for Copper

Available Cu (ppm)	Category	Recommendations
< 0.2	Low	$CuSO_4$: 10 kg/ha (B.D.) + 0.5% $CuSO_4$ (2 F.S.)
0.2 to 0.6	Medium	$CuSO_4$: 5 kg/ha (B.D.)
> 0.6	High	No Application Needed

Abbreviation	Full Form	Abbreviation	Full Form	Abbreviation	Full Form	Abbreviation	Full Form
ppm	Parts per million	P.I.	Panicle Initiation	dsm^{-1}	Decisiemens per metre	F.S.	Foliar Spray
kg/ha	Kilogram per hectare	C.S.	Cropping System	DAT	Days After Transplanting	B.D.	Basal Dose

ICAR-National Rice Research Institute, Cuttack, Odisha

Fig.8. Soil Health Card prepared under project SAFAR

5.2 Farmers' field selection for trials

Fields with a pH below 6.0 were selected for farmers' field trials. These fields were deemed suitable for evaluating the effectiveness of **EcoLime$^+$** in neutralizing soil acidity and enhancing crop production. A detailed list of selected farmers' fields in each district is provided in Annexure IV

To ensure ethical and transparent implementation, formal written consents were obtained from each farmer in a specific format before initiating field trials (Photo Plate No 3; Annexure IV). Farmers were informed about the objectives, benefits, and expected outcomes of the trials.

5.3 Arrangement of Compost

Compost, an essential component in the formulation of **EcoLime**$^{+}$, was arranged at the local level with district-specific sourcing strategies. In Jajpur, compost was procured from farmers' participation using locally available materials; while in Angul, compost was procured from local sources. In Cuttack and Dhenkanal, compost was partially produced with the help of FPOs and partially purchased from the local market. However, in Sundargarh and Jharsuguda, compost was fully sourced from local suppliers. The compost was used after getting proper laboratory analysis of desired compost quality assessment at CRRI.

To ensure quality consistency, compost samples from each location were analyzed for essential parameters such as C:N ratio, nitrogen content, and moisture content before use. A detailed summary of the compost arrangement strategy is provided in Table 8.

Table. 8. Compost arrangement strategies for different districts

District	Mode of Compost procurement for the preparation of EcoLime^{+}
Cuttack	For Mahanga block, compost bought from local compost sellers with the help of 4S4R Seed producer company Limited, FPO and Smart Farming Start-up For Tangi block, farmers used their own (participatory mode) compost for the production of **EcoLime**$^{+}$
Jajpur	For Jajpur district, farmers contribute (participatory mode) their own compost for the production of **EcoLime**$^{+}$
Dhenkanal	For Dhenkanal district compost; bought from local compost sellers with the collaboration of Smart Farming Start-up
Angul	For Angul district; compost bought from local compost sellers with the collaboration of Shree Suklambar Farmers producer company Limited, FPO
Jharsuguda	For Jharsuguda district, compost bought from local compost sellers with the collaboration of Biotez Agrinovation, Start-up
Sundargarh	For Sundargarh district, compost bought from local compost sellers with the collaboration of Bio-Tez Agrinovation, Start-up.

5.4 Mass deposition of basic slag (BS) and fly ash (FA)

After securing formal approvals from the concerned authorities, the industries initiated mass deposition of FA and BS at the designated field locations with their own cost in collaborative mode. Communication was established with industries regarding the required quantities of FA and BS; and from April 2024 onward, industries began supplying the specified raw materials.

Fig. 9. Mass deposition of fly ash and basic slag at different sites

Table 9. Amount of basic slag and fly ash supplied by the industries in first phase

Districts	Supplier with their own cost in collaborative mode	Amount deposited (tons)
Sundargarh	Rourkela Steel Plant, SAIL	1000(FA)
Jharsuguda	Vedanta Ltd., Jharsuguda	750(FA)
Dhenkanal	Tata Steel, Meramandali, Dhenkanal	65(BS)
Jajpur	Tata Steel, Kalinga Nagar, Jajpur	38(BS)
Angul	Tata Steel, Meramandali, Angul	65(BS)
Cuttack	Tata Steel, Kalinga Nagar, Jajpur	110(BS)

5.5 Mass production and distribution of EcoLime+

For the mass production of **EcoLime+**, two distinct strategies were implemented during the first phase of the project. The first approach involved off-site production, where the product was manufactured following the Standard Operating Procedure (SOP) at startup production facilities located in Bhubaneswar, Dhenkanal, and Rourkela. From these production sites, **EcoLime+** was packaged and directly delivered to farmers' fields, ensuring efficiency in logistics and distribution (Photo plate no 5).

The second approach focused on on-site production, where Farmer Producer Organizations (FPOs) were engaged in producing **EcoLime+** at decentralized village-level units with the supervision of technical project staffs to ensure the quality of the product. The product was formulated locally and distributed within nearby farming communities.

Based on field observations and farmer feedback, the off-site production and direct delivery method proved to be more efficient and widely accepted, as it ensured better product quality, at source level consistency, and convenient distribution. Learning from the first phase, the second phase of the project entirely shifted to off-site production, where **EcoLime**$^{+}$ was manufactured at startup production units and directly distributed in well-packed bags to farmers' fields; streamlining the supply chain and ensuring ease of application.

Fig. 10. Mass production of EcoLime^{+} at startups (off site production)

6. Experimental and farmers' field trials

The effectiveness of **EcoLime**$^{+}$ in improving soil properties and crop productivity was evaluated through controlled experimental trials and farmers' field trials across six districts. The trials were designed to assess the impact of **EcoLime**$^{+}$ on soil pH, and crop performance providing a scientific basis for its large-scale adoption.

6.1 Experiment at KVK, Santhapur, and ICAR-CRRI, Cuttack

To validate the efficacy of **EcoLime**$^{+}$ under controlled conditions, the first experimental trials were conducted at two research sites:

1. ***KVK, Santhapur, Cuttack*** – The test crop was black gram, selected for its sensitivity to soil acidity and its role in sustainable cropping systems.
2. ***ICAR-CRRI, Cuttack*** – The test crop was rice, which is widely cultivated in acid soils and serves as a key staple crop in Odisha.

In both trials, **EcoLime**$^{+}$ was applied following a standardized broadcasting method and incorporated into the soil according to the recommended protocol. Regular observations were recorded to monitor changes in soil pH, plant growth, and crop yield. After achieving successful results from these experimental plots, the technology was extended to farmers' fields for large-scale validation.

Fig. 11. Experimental plots, KVK, Santhapur

Fig. 12. Experimental plots, ICAR-CRRI, Cuttack

6.2 Farmers' field trials across different districts

After the initial experimental success, **EcoLime**$^{+}$ was introduced in farmers' fields to test its performance on farming conditions. A total of 324.37 hectares (812.50 acres) of land were covered in the first phase, with the primary crops being rice and pulses.

The application method involved broadcasting **EcoLime**$^{+}$ across the fields and mixing it into the soil following the standard protocol (Table 12).

In the second phase, the field trials were expanded to an additional 197 acres, with a focus on pulses, perennial fruit crops, and plantation crops (Photo plate no. 6). These trials helped to assess the long-term impact of **EcoLime**$^{+}$ on diverse cropping systems.

Table 10. Total area covered in phase 1 (August to November, 2023)

Districts	Total area covered (Acre)	Total Farmers (Nos.)	Type of Crops
Cuttack	183.42	69	Rice
Dhenkanal	137.50	117	Rice
Jajpur	125	55	Rice
Jharsuguda	125	52	Rice
Angul	140	61	Rice and Plantation crop
Sundargarh	100	43	Rice

Table 11. Total area covered in phase 2 (April-Oct, 2024)

Districts	Total area covered (Acre)	Total Farmers (Nos.)	Type of Crops
Cuttack	70	50	Pulses
Jajpur	31	20	Pulses
Jharsuguda	37	21	Rice, Green gram, Mustard
Sundargarh	70	12	Napier, Mango

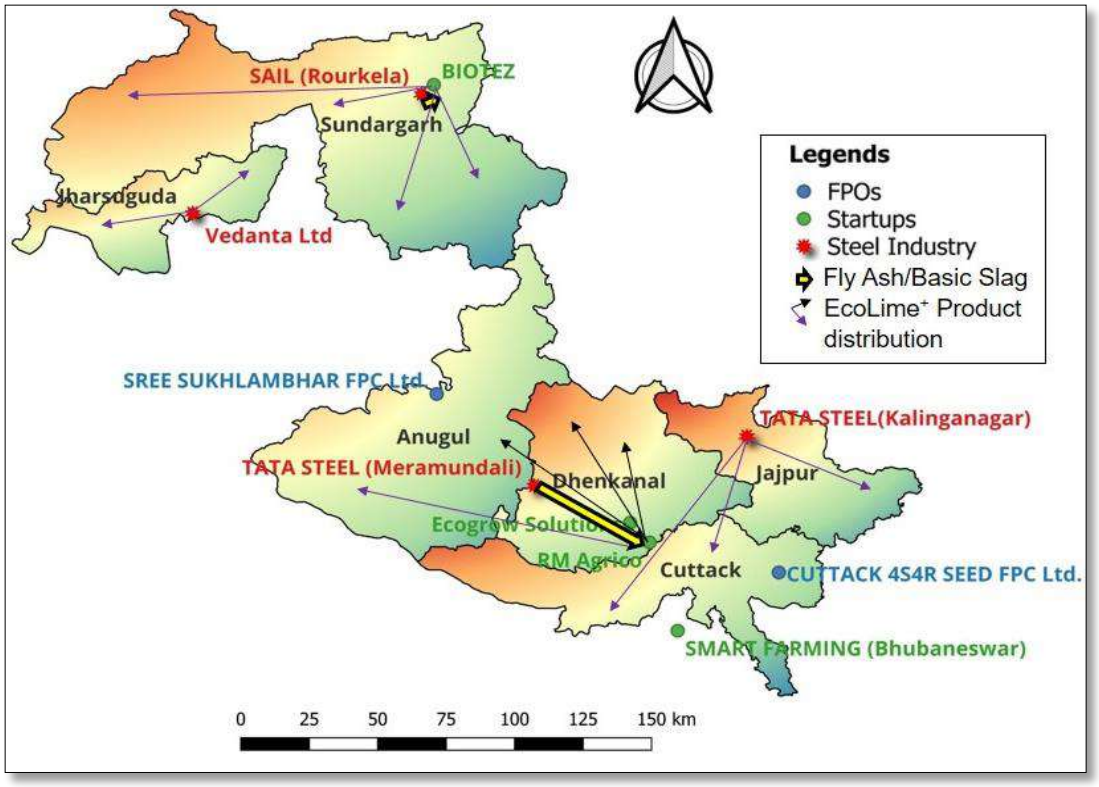


Fig. 13. Location and Distribution maps of Industry, Start-ups and FPOs contributing to filed application of First Introduce the EcoLime^{+} product.

6.3 Field observations and data collection

Regular monitoring and data collection were conducted to assess the performance of **EcoLime**$^{+}$ in farmers' fields. The key parameters recorded included:

- ✓ Soil pH at different crop growth stages.
- ✓ Plant growth parameters.
- ✓ GHG emissions (CH_4, N_2O, and CO_2)
- ✓ Yield data from treated plots with **EcoLime**$^{+}$ and control plots (without **EcoLime**$^{+}$) for comparative analysis.
- ✓ Heavy metals in soil and harvested grains and pods
- ✓ Post-harvest soil analysis
- ✓ Farmer feedback surveys to assess ease of application, crop response, and economic benefits.

The results of those trials provided scientific validation of the benefits of **EcoLime**$^{+}$ in improving soil health, enhancing crop productivity, and promoting sustainable acid soil management in Odisha.

Table 12. Standard operating protocols for EcoLime^{+} application in agriculture

Product	**EcoLime**$^{+}$ (Soil amendment)
Mode of application	❁ Apply the value-added products during field preparation ❁ Distribute evenly across the field at the recommended dosage ❁ Ensure incorporation into the soil to maximize effectiveness
Rate of application	❁ 1-10 t/ha ❁ Based on soil pH and product type
Schedule of application	❁ During field preparation, once in every alternate year •After two consecutive years of application, rate, dosage and frequency of application should be again decided based on soil test data (pH, heavy metal content, etc.)
Preferable field condition	❁ Works best in Soil pH<5.5 (acid soil) ❁ Works best in weed free field ❁ Field may be moist but no ponding water to ease the mixing of products
Precautions	❁ Heavy metals (Cr, Pb, Cd) content in the products must be below permissible limit.

7. Agronomic and environmental benefits

The application of **EcoLime**$^{+}$ in acid soils demonstrated significant agronomic and environmental benefits, including improvement in soil pH and nutrient status, reduction in greenhouse gas (GHG) emissions, and enhancing crop yield. The findings from multi-location field trials across different districts of Odisha confirm its potential as an effective and sustainable soil amendment.

7.1 Improvement in soil pH and nutrient status

To assess the impact of **EcoLime**$^{+}$ on soil acidity and fertility, soil samples were collected from each selected field before and after application of **EcoLime**$^{+}$. Sample were analyzed for pH, nitrogen (N), phosphorus (P), potassium (K), organic carbon (OC), and micronutrient levels. Based on the initial soil pH, the appropriate **EcoLime**$^{+}$ dosage was applied; and intermediate soil tests were conducted to monitor changes. After the harvest of the first crop, soil samples were again collected to determine the effect of **EcoLime**$^{+}$ on soil properties. Control plots, where **EcoLime**$^{+}$ was not applied, were also analyzed for comparative assessment. Results showed a significant improvement in soil pH after just one cropping season (Table. 13a-e) In addition to pH improvement, **EcoLime**$^{+}$ enhanced nutrient availability, particularly phosphorus and nitrogen, which are often deficient in acid soils. Farmers reported better crop establishment, improved root growth, and increased tillering in rice fields, suggesting improved soil health conditions (Photo plate no 7).

Table 13a. Percentage increase in pH of Angul district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Initial pH	pH after Harvest	% increase
1	Uravashi Pradhan	Salakhamana	21.1427	84.9076	4.67	4.87	4.28
2	Tapi Pradhan	Salakhamana	21.1427	84.9076	4.22	4.56	8.06
3	Shrinivas Pradhan	Salakhamana	21.1337	84.9048	5.11	5.24	2.54
4	Kabita Pradhan	Salakhamana	21.4273	84.9076	5.23	5.46	4.40
5	Bhramar Pradhan	Salakhamana	21.1369	84.9092	4.84	5.03	3.93
6	Babula Senapati	Salakhamana	21.1088	84.9247	5.21	5.46	4.80
7	Prahalad Bhoi	Salakhamana	21.1432	84.9075	5.07	5.35	5.52
8	Bhuban Bhoi	Salakhamana	21.1394	84.9092	5.11	5.41	5.87
9	Mali Bhoi	Salakhamana	21.1325	84.9107	4.44	5.04	5.18
10	Sumant Pradhan	Salakhamana	21.1398	84.9094	5.12	5.42	5.86
11	Sarat Sahu	Nuagaon	21.1121	84.7403	5.00	5.34	6.80
12	Binod Sahu	Nuagaon	21.1147	84.7443	5.04	5.26	4.37
13	Basant Sahu	Nuagaon	21.1124	84.7411	4.96	5.17	4.23
14	Abhaya Ku. Sahoo	Nuagaon	21.1121	84.7403	5.02	5.17	2.99
15	Sarat Sahoo	Nuagaon	21.1070	84.7340	5.00	5.24	4.80
16	Kruti basa Behera	Nuagaon	21.1163	84.7332	4.96	5.13	3.43
17	Binod Sahu	Nuagaon	21.1163	84.7332	4.91	5.15	4.89
18	Purnachandra Sahoo	Nuagaon	21.0802	84.7361	4.87	5.04	3.49
19	Chakradhar Pradhan	Nuagaon	21.1079	84.9084	4.92	5.01	1.83

20	Prafulla Bhoi	Nuagaon	21.1116	84.8840	4.95	5.06	2.22

Table 13b. Percentage increase in pH of Cuttack district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Initial pH	pH after Harvest	% increase
1	Sarat Chandra Swain	Nahanga	20.5202	86.1819	5.22	5.42	3.83
2	Dhaneswar Swain	Nahanga	20.5199	86.1809	5.11	5.31	3.91
3	Madan Mohan Swain	Nahanga	20.5193	86.1817	4.88	5.12	4.92
4	Sarat Chandra Swain	Nahanga	20.5199	86.1828	4.67	4.88	4.49
5	Jayadev Swain	Nahanga	20.5190	86.1837	4.92	5.02	2.03
6	Madan Mohan Swain	Nahanga	20.5187	86.1833	4.77	4.98	4.40
7	Jayadev Swain	Nahanga	20.5214	86.1859	5.15	5.36	4.08
8	Rajkishore Rout	Nahanga	20.5207	86.1840	5.20	5.37	3.27
9	Rajkishore Rout	Nahanga	20.5211	86.1839	4.92	5.12	4.07
10	Batakrushna Rout	Nahanga	20.5209	86.1835	4.66	4.87	4.51
11	Balaram Sahoo	Jaripada	20.5664	86.0376	5.33	5.62	5.44
12	Sarat Chandra Sahoo	Jaripada	20.5661	86.0107	5.29	5.52	4.35
13	Ajaya Parida	Safa	20.6626	85.9381	5.11	5.27	3.13
14	Bijaya Parida	Safa	20.6627	85.9379	5.09	5.26	3.34
15	Durlabha Sahoo	Safa	20.6628	85.9378	5.02	5.27	4.98
16	Ghanshyama Behera	Safa	20.6629	85.9377	4.83	5.12	6.00

17	Sulabha Sahoo	Safa	20.6629	85.9377	4.92	5.04	2.44
18	Gopala Beura	Safa	20.6631	85.9377	5.21	5.31	1.92
19	Hemanta Beura	Safa	20.6631	85.9375	4.47	4.66	4.25
20	Nrushinha Charan Pradhan	Jaripada	20.5640	86.0389	4.67	4.89	4.71

Table 13c. Percentage increase in pH of Dhenkanal district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Initial pH	pH after Harvest	% increase
1	Hiranya Rout	Kandabindha	20.4424	85.0213	5.03	5.16	2.58
2	Himanshu rout	Kandabindha	20.4079	85.3053	4.95	5.11	3.23
3	Suraj Kumar Moharana	Kandabindha	20.6658	85.4977	5.28	5.36	1.52
4	Biswanath Dalai	Kandabindha	20.6661	85.5009	5.25	5.34	1.71
5	Akhil Dalei	Kandabindha	20.4130	85.3022	5.19	5.26	1.35
6	Pratap Kumar Parida	Kandabindha	20.6688	85.5107	5.13	5.47	6.63
7	Prabhas Kumar Parida	Kandabindha	20.6689	85.5028	5.13	5.36	4.48
8	Arundhati Dalei	Kandabindha	20.6690	85.5057	5.16	5.38	4.26
9	Atitha Parida	Kandabindha	20.6689	85.5028	4.93	5.24	6.29
10	Amulya Sahoo	Kandabindha	20.6688	85.5108	4.94	5.22	5.67
11	Sagar Chandra Parida	Kandabindha	20.6690	85.5057	4.95	5.17	4.44
12	Soubhagya Rout	Kandabindha	20.6689	85.5021	5.09	5.18	1.77
13	Gyanendra Rout	Kandabindha	20.3114	85.4063	4.53	4.85	7.06

14	Shantilata Rout	Kandabindha	20.6690	85.5057	5.12	5.45	6.45
15	Sumitra Rout	Kandabindha	20.6732	85.5089	4.97	5.17	4.02
16	Batakrushn a Behera	Kandabindha	20.6732	85.5089	5.30	5.41	2.08

Table 13d. Percentage increase in pH of Jajpur district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Initial pH	pH after Harvest	% increase
1	Sukadev Nayak	Dehurigarh	20.7	85.98	5.2	5.32	2.31
2	Kalandi Nayak	Dehurigarh	20.7	85.98	5.03	5.23	3.98
3	Ranjan Nayak	Dehurigarh	20.7	85.98	5.04	5.31	5.36
4	Jayant Nayak	Dehurigarh	20.7	85.98	4.98	5.12	2.81
5	Kasani Nayak	Dehurigarh	20.7	85.98	5.04	5.32	5.56
6	Balakrush na Nayak	Dehurigarh	20.72	85.98	5.34	5.46	2.25
7	Kunja Nayak	Dehurigarh	20.7	85.98	4.83	5.11	5.8
8	Babina Nayak	Dehurigarh	20.7	85.98	5.22	5.34	2.3
9	Rajit Nayak	Dehurigarh	20.7	85.98	4.91	5.06	3.05
10	Shridhar Nayak	Dehurigarh	20.7	85.98	5.12	5.24	2.34
11	Prafulla Dehury	Gadimagura	20.71	85.96	4.8	5.03	4.79
12	Bilashi Samal	Gadimagura	20.73	86.03	4.78	4.98	4.18
13	Jyotshna Samal	Gadimagura	20.73	86.03	4.78	4.96	3.77

14	Manasi Dehury	Gadimagura	20.73	86.03	4.84	5.02	3.72
15	Neheg Dehury	Gadimagura	20.73	86.03	4.61	4.86	5.42
16	Kamala Samal	Gadimagura	20.73	86.03	4.69	4.89	4.26
17	Sanjani Samal	Gadimagura	20.73	86.03	4.59	4.87	6.1
18	Jhili Samal	Gadimagura	20.73	86.03	4.52	4.72	4.42
19	Pramod Dehury	Gadimagura	20.73	86.03	5.58	5.63	0.9

Table 13e. Percentage increase in pH of Jharsuguda district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Initial pH	pH after harvest	% increase
1	Bisikesan Patel	Gudigaon	21.880	84.163	5.15	5.31	3.11
2	Dhanabanta Patel	Gudigaon	21.870	84.093	5.10	5.28	3.53
3	Mitrabhanu Patel	Gudigaon	21.869	84.095	5.12	5.26	2.73
4	Akanta Patel	Gudigaon	21.870	84.095	5.27	5.32	0.95
5	Tejraj Patel	Gudigaon	21.869	84.095	5.36	5.43	1.31
6	Mandakini Patel	Gudigaon	21.857	84.082	5.33	5.41	1.50
7	Santosh Binnochia	Gudigaon	21.858	84.081	5.00	5.24	4.80
8	Sunil Ku. Kilo	Gudigaon	21.856	84.080	5.15	5.23	1.55
9	Bholanath Patel	Gudigaon	21.856	84.079	5.36	5.58	4.10
10	Jiten Patel	Gudigaon	21.855	84.078	5.32	5.54	4.14
11	Jena Mani kisan	Kelendamal	21.857	84.115	5.21	5.42	4.03
12	Gokula Meher	Kelendamal	21.857	84.115	5.11	5.34	4.50

13	Soudagar Meher	Kelendamal	21.859	84.117	5.23	5.43	3.82
14	Kabita Patel	Kelendamal	21.864	84.112	5.21	5.41	3.84
15	Golapi Nayak	Kelendamal	21.864	84.113	5.37	5.46	1.68
16	Rupananada Nayak	Kelendamal	21.864	84.114	5.24	5.47	4.39
17	Sitaram Patel	Kelendamal	21.857	84.114	5.23	5.41	3.44
18	Sarat Ku. Patel	Kirimira	21.890	84.170	5.13	5.34	4.09
19	Hrudananda Patel	Kirimira	21.889	84.171	5.23	5.44	4.02

7.2 Reduction of greenhouse gases emissions

EcoLime^{+} contributed to a reduction in methane (CH_4) and nitrous oxide (N_2O) emissions from rice fields, which are major contributors to GHG emissions in flooded rice cultivation. This effect is attributed to the presence of silicon (Si) and iron (Fe) in **EcoLime**$^{+}$, which play a role in suppressing methanogenesis and regulating nitrogen transformations in soil. Experimental data revealed that CH_4 emissions were reduced by 8–10% compared to control fields, while N_2O emissions were reduced by 9–12%, indicating a significant mitigation of nitrous oxide emission. These findings highlighted the potential climate benefits of **EcoLime**$^{+}$ application, making it an environmental sustainable alternative for managing acid soils in rice-based cropping systems.

7.3 Impact on crop yield and productivity

The use of **EcoLime**$^{+}$ resulted in substantial improvements in crop yield and productivity across multiple locations. Multi-location field trials demonstrated an average increase of 13% in rice yield and 18% in black gram yield after one year of application (17a-e). In the first phase of field trials, rice and pulses were the primary test crops. Harvest data collected from farmers' fields showed notable yield advancements compared to control (fields where **EcoLime**$^{+}$ was not applied). The observed yield increases were between 5.9% and 21.1% in Cuttack, around 10-15% in Jajpur, around 12-19% in Jharsuguda, around 8.9-12% in Angul, around 14.3-19% in Dhenkanal, and around 17% in Sundargarh. In the case of pulses, particularly green gram, yield enhancement was even more significant, with 12.4-25% increase in Cuttack.

These findings confirm that **EcoLime**$^{+}$enhanced soil fertility, improved plant nutrient uptake, and resulted in higher biomass accumulation, leading to better grain filling and overall yield improvement. Additionally, grain and pod samples from treated fields (where **EcoLime**$^{+}$ was applied) were tested for heavy metal accumulation, and the results confirmed that **EcoLime**$^{+}$ does not have any negative effect on grain quality rather it effectively reduced the bioavailability of toxic metals, ensuring safe and nutritious food production. Post-harvest soil analysis further indicated that the positive effects of **EcoLime**$^{+}$were sustained beyond a single crop cycle, demonstrating its potential for long-term benefits for soil health and crop productivity. **EcoLime**$^{+}$ was

also applied to plantation and fruit crops such as mango, lemon, and cashew, demonstrating promising results in those crops as well.

Table 14a. Percentage increase in yield of Angul district

Sl. No	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Area (Acres)	Yield 2023-24 (q/a)	Average yield of control plot (q/a)	% Increase in yield
1	Uravashi Pradhan	Salakhamana	21.143	84.908	1.2	19.3	16.7	15.0
2	Tapi Pradhan	Salakhamana	21.143	84.908	1	19.5	16.3	19.3
3	Shrinivas Pradhan	Salakhamana	21.134	84.905	4.5	17.6	15.6	12.3
4	Kabita Pradhan	Salakhamana	21.427	84.908	2.4	17.9	16.3	9.4
5	Bhramar Pradhan	Salakhamana	21.137	84.909	2	19.0	17.3	9.4
6	Babula Senapati	Salakhamana	21.109	84.925	3.2	18.1	16.5	9.4
7	Prahalad Bhoi	Salakhamana	21.143	84.907	1.75	18.3	15.6	16.8
8	Bhuban Bhoi	Salakhamana	21.139	84.909	1.5	19.7	16.3	20.4
9	Mali Bhoi	Salakhamana	21.133	84.911	1.4	20.7	16.8	22.6
10	Sumant Pradhan	Salakhamana	21.140	84.909	3	20.1	18.5	8.6
11	Sarat Sahu	Nuagaon	21.112	84.740	2.35	19.8	15.4	28.4
12	Binod Sahu	Nuagaon	21.115	84.744	2.1	20.1	18.5	8.5
13	Basant Sahu	Nuagaon	21.112	84.741	1.8	18.9	14.3	31.6
14	Abhaya Ku. Sahoo	Nuagaon	21.112	84.740	2.2	17.0	16.0	6.1
15	Sarat Sahoo	Nuagaon	21.107	84.734	1.3	18.5	16.5	11.6
16	Krutibasa Behera	Nuagaon	21.116	84.733	1.5	18.7	15.1	23.2

17	Binod Sahu	Nuagaon	21.116	84.733	1.5	18.7	15.6	19.3
18	Purnachandra Sahoo	Nuagaon	21.080	84.736	3.2	18.3	14.3	27.6
19	Chakradhar Pradhan	Nuagaon	21.108	84.908	4	19.1	16.8	13.1
20	Prafulla Bhoi	Nuagaon	21.112	84.884	3.5	18.6	15.6	18.6

Table 14b. Percentage increase in yield of Cuttack district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Area (Acre)	Yield 2023-24 (q/a)	Average yield of control plot (q/a)	% Increase in yield
1	Sarat Chandra Swain	Nahanga	20.520	86.182	1	17.5	15.4	13.20
2	Dhaneswar Swain	Nahanga	20.520	86.181	1	19	16.3	16.42
3	Madan Mohan Swain	Nahanga	20.519	86.182	2	20	14.3	39.66
4	Sarat Chandra Swain	Nahanga	20.520	86.183	1.5	17.66	15.8	11.28
5	Jayadev Swain	Nahanga	20.519	86.184	2	18.5	16.5	11.99
6	Madan Mohan Swain	Nahanga	20.519	86.183	2	18.5	15.4	19.90
7	Jayadev Swain	Nahanga	20.521	86.186	1	18.25	16.7	8.76
8	Rajkishore Rout	Nahanga	20.521	86.184	2.5	18.4	15.4	19.33
9	Rajkishore Rout	Nahanga	20.521	86.184	2.2	19.31	16.8	14.46
10	Batakrushna Rout	Nahanga	20.521	86.183	1.4	18.21	16.1	12.90
11	Balaram Sahoo	Jaripada	20.566	86.038	1	18	16.3	10.02

12	Sarat Chandra Sahoo	Jaripada	20.566	86.011	2	19	15.7	20.56
13	Ajaya Parida	Safa	20.663	85.938	1	18	16.9	6.01
14	Bijaya Parida	Safa	20.663	85.938	1	17.5	15.4	13.12
15	Durlabha Sahoo	Safa	20.663	85.938	1	21.5	17.8	20.18
16	Ghanshyama Behera	Safa	20.663	85.938	2	19.75	17.6	11.77
17	Sulabha Sahoo	Safa	20.663	85.938	1	17.5	15.4	13.12
18	Gopala Beura	Safa	20.663	85.938	1	19	17.8	6.32
19	Hemanta Beura	Safa	20.663	85.938	2	20	17.6	13.19
20	Nrushinha Charan Pradhan	Jaripada	20.564	86.039	1.5	17.66	15.4	14.60

Table 14c. Percentage increase in yield of Dhenkanal district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Area (Acre)	Yield 2023-24 (q/a)	Average yield of control plot (q/a)	% Increase in yield
1	Hiranya Rout	Kandabindha	20.442	85.021	1	18.0	15.4	16.8
2	Himanshu rout	Kandabindha	20.408	85.305	1.5	17.7	16.5	7.2
3	Suraj Kumar Moharana	Kandabindha	20.666	85.498	1.5	16.7	14.3	16.7
4	Biswanath Dalai	Kandabindha	20.666	85.501	2	18.5	16.1	14.8
5	Akhil Dalei	Kandabindha	20.413	85.302	2	19.3	16.7	15.4
6	Pratap Kumar Parida	Kandabindha	20.669	85.511	1	17.5	14.8	17.7
7	Prabhas Kumar Parida	Kandabindha	20.669	85.503	1	18.3	15.8	15.3
8	Arundhati Dalei	Kandabindha	20.669	85.506	1.5	17.7	14.3	23.7
9	Atitha Parida	Kandabindha	20.669	85.503	1.8	18.6	15.9	16.4

10	Amulya Sahoo	Kandabindha	20.669	85.511	1	17.5	15.1	15.4
11	Sagar Chandra Parida	Kandabindha	20.669	85.506	2	18.0	16.6	8.2
12	Soubhagya Rout	Kandabindha	20.669	85.502	1.5	16.3	14.3	13.9
13	Gyanendra Rout	Kandabindha	20.311	85.406	1	18.0	16.7	7.3
14	Shantilata Rout	Kandabindha	20.669	85.506	1.4	16.8	15.4	8.6
15	Sumitra Rout	Kandabindha	20.673	85.509	1	20.0	18.7	6.8
16	Batakrushna Behera	Kandabindha	20.673	85.509	2	18.3	15.9	14.5

Table 14d. Percentage increase in yield of Jajpur district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Area (Acre)	Yield 2023-24 (q/a)	Average yield of control plot (q/a)	% Increase in yield
1	Sukadev Nayak	Dehurigarh	20.70	85.98	4	19.5	18.5	5.3
2	Kalandi Nayak	Dehurigarh	20.70	85.98	3.5	20.6	18.6	10.5
3	Ranjan Nayak	Dehurigarh	20.70	85.98	2	19.3	18.2	5.7
4	Jayant Nayak	Dehurigarh	20.70	85.98	2	20.8	18.7	11.1
5	Kasani Nayak	Dehurigarh	20.70	85.98	2.6	19.7	18.6	5.7
6	Balakrushna Nayak	Dehurigarh	20.72	85.98	1	19.9	19.0	4.3
7	Kunja Nayak	Dehurigarh	20.70	85.98	2	22.0	19.7	11.3
8	Babina Nayak	Dehurigarh	20.70	85.98	1	21.5	18.5	16.0
9	Rajit Nayak	Dehurigarh	20.70	85.98	1.5	22.0	18.6	18.0
10	Shridhar Nayak	Dehurigarh	20.70	85.98	2	19.3	18.4	4.7
11	Prafulla Dehury	Gadimagura	20.71	85.96	1.5	22.0	18.7	17.3
12	Bilashi Samal	Gadimagura	20.73	86.03	3	19.8	18.5	6.8
13	Jyotshna Samal	Gadimagura	20.73	86.03	2.5	21.0	18.6	12.5
14	Manasi Dehury	Gadimagura	20.73	86.03	1	21.0	18.3	14.6
15	Neheg Dehury	Gadimagura	20.73	86.03	2	21.3	17.8	19.3
16	Kamala Samal	Gadimagura	20.73	86.03	1	20.0	17.6	13.4
17	Sanjani Samal	Gadimagura	20.73	86.03	1	19.9	16.9	17.2

18	Jhili Samal	Gadima gura	20.73	86.03	2.5	21.4	17.4	22.4
19	Pramod Dehury	Gadima gura	20.73	86.03	4	19.5	17.9	8.8

Table 14e. Percentage increase in yield of Jharsuguda district

Sl. No.	Farmer's Name	Village	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Area (Acre)	Yield 2023-24 (q/a)	Average yield of control plot (q/a)	% Increase in yield
1	Bisikesan Patel	Gudigaon	21.880	84.163	1.2	19.3	17.2	12.0
2	Dhanaban ta Patel	Gudigaon	21.870	84.093	1	19.5	18.2	6.8
3	Mitrabha nu Patel	Gudigaon	21.869	84.095	4.5	17.6	16.8	4.3
4	Akanta Patel	Gudigaon	21.87	84.095	2.4	17.9	16.5	8.0
5	Tejraj Patel	Gudigaon	21.869	84.095	2	19	18.2	4.1
6	Mandakin i Patel	Gudigaon	21.857	84.082	3.2	18.1	17.1	5.4
7	Santosh Binnochia	Gudigaon	21.858	84.081	1.75	18.3	17.0	7.5
8	Sunil Ku. Kilo	Gudigaon	21.856	84.08	1.5	19.7	17.5	12.3
9	Bholanath Patel	Gudigaon	21.856	84.079	1.4	20.7	16.8	22.6
10	Jiten Patel	Gudigaon	21.855	84.078	3	20.1	16.5	21.5
11	Jena Mani kisan	Kelendam al	21.857	84.115	2.35	19.8	17.0	16.4
12	Gokula Meher	Kelendam al	21.857	84.115	2.1	20.1	16.7	20.0
13	Soudagar Meher	Kelendam al	21.859	84.117	1.8	18.9	16.9	11.5
14	Kabita Patel	Kelendam al	21.864	84.112	2.2	17	15.2	11.6
15	Golapi Nayak	Kelendam al	21.864	84.113	1.3	18.5	16.4	12.6
16	Rupanana da Nayak	Kelendam al	21.864	84.114	1.5	18.7	16.7	11.4
17	Sitaram Patel	Kelendam al	21.857	84.114	1.5	18.7	16.3	14.6
18	Sarat Ku. Patel	Kirimira	21.89	84.17	3.2	18.3	17.2	6.0
19	Hrudanan da Patel	Kirimira	21.889	84.171	4	19.1	17.6	8.3

8. Capacity building and farmer training programs

To ensure the successful adoption and effective application of **EcoLime**$^{+}$, a series of training programs were conducted across different districts of Odisha. These programs aimed to educate farmers, and other stakeholders about soil sampling and analysis, soil acidity management, **EcoLime**$^{+}$ application methods, and its effective agronomic and environmental benefits. The training sessions focused on hands-on demonstrations, interactive discussions; and knowledge-sharing; and farmer's feedback sessions to enhance farmer's understanding and confidence in using the product.

8.1 Training programs conducted across districts

In each district, training programs were organized in collaboration with KVKs, FPOs, agricultural extension officers, state government officials, and local governing bodies. These sessions focused on various key topics, including soil sampling techniques, the importance of soil health cards, strategies for soil health improvement, acid soil management, recommended dosage and application timing of **EcoLime**$^{+}$, field management practices, and compost production techniques. Additionally, expected yield benefits and long-term impacts on soil fertility of **EcoLime**$^{+}$ were discussed in detail.

To enhance understanding, audio-visual demonstrations were conducted on the production and application of **EcoLime**$^{+}$; providing farmers with a hands-on learning experience. These demonstrations helped to illustrate best practices, ensuring correct product usage for maximum benefit. Furthermore, the training sessions served as an open forum for farmers to discuss agriculture-related challenges, allowing experts to provide solutions tailored to their specific field conditions.

Each session featured specialists in soil science, pest and disease management, agricultural extension, economics, and horticulture, ensuring a comprehensive approach to problem-solving. By bringing together expertise from multiple disciplines, farmers received well-rounded guidance to improve their farming practices and overall productivity.

Angul

In Angul, two training programs were conducted, with a total of 280 farmers participants. The sessions included discussions on the impact of acid soils on crop yields, strategies for soil pH management, and hands-on demonstrations of **EcoLime**$^{+}$ application in rice and plantation crops.

Fig. 14. Training programs at Angul, district

Cuttack

In, Cuttack three training programs, where 238 participants attended the sessions. Farmers in this district were particularly interested in learning about the effects of **EcoLime**$^{+}$on paddy fields and horticultural crops; Practical field visits were arranged to demonstrate soil improvement techniques.

Fig. 15. Training program at Cuttack

Dhenkanal

Four training sessions were done at Dhenkanal, involving 539 participants. The discussions were held on soil health improvement and the role of **EcoLime**$^{+}$ in enhancing nutrient availability. Farmers in the region showed a keen interest in applying **EcoLime**$^{+}$ to fruit and plantation crops. Additionally, they were trained on compost preparation using locally available agricultural raw materials, equipping them with sustainable soil management practices.

Fig. 16. Training program at Dhenkanal

Jajpur

A single but impactful training session was conducted in Jajpur, where 83 farmers participated. This district, known for its pulse and fruit crop cultivation, benefited from discussions on the application of **EcoLime**$^{+}$ in improving crop resilience and productivity.

Fig. 17. Training program at Jajpur

Jharsuguda

Two training programs are conducted at Jharsuguda, with 168 participants receiving training on the benefits of **EcoLime**$^{+}$ for acid soil management, particularly in rice and plantation crops. Farmers were introduced to best practices for applying the product, along with real-time soil pH testing demonstrations.

Fig. 18. Training program at Jharsuguda

Sundargarh

A single but useful training session was conducted in Sundargarh, where 70 farmers participated. This district, known for its rice and plantation crop cultivation, benefited from discussions on the application of **EcoLime**$^{+}$for improving crop resilience and productivity.

Fig. 19. Training program at Sundargarh

Table 15. Training Program Details of Project Districts:

District	Location	No of training	No of participants
Cuttack	Tangi	1	30
	Mahanga	2	208
Dhenkanal	Odapada	3	403
	Kankadahad	1	136
Jajpur	Badachana	1	83
Jharsuguda	Kolabira	2	168
Angul	Chhendipada	2	280
Sundargarh	Lathikata	1	70
		TOTAL	**1378**

A total of 1378 farmers and stakeholders participated in the training programs, gaining important knowledge on soil acidity management and the effective use of **EcoLime**$^{+}$. These capacity-building initiatives were instrumental in raising awareness, promoting large-scale adoption, and equipping farmers with the necessary skills to improve soil fertility and enhance crop productivity in acidic soil regions of Odisha. During each training session, soil health cards, improved rice seeds of various varieties, and microbial consortia for compost preparation were distributed to participants. In total, 1097 soil health cards were provided to farmers, ensuring they had access to crucial information for better soil and crop management.

8.2 Special campaigns, workshops and seminars organized under project SAFAR

Launching Workshop and Brainstorming Session

A project launching workshop and brainstorming session was organized on October 17, 2023, bringing together key stakeholders, including partner from State Govt., industries, startups, Farmer Producer Organizations (FPOs), farmers, and scientists from various research institutions. The event served as a platform to introduce the project objectives, discuss implementation strategies; and foster collaboration among all partners. During the session, an in-depth information was given on the scope and significance of the project, highlighting the role of **EcoLime**$^{+}$ in acid soil management and sustainable agriculture. Each partner's role was clearly outlined; with industries

role for responsible supply of raw materials; startups role for managing production and distribution of products; and FPOs role for facilitating farmer outreach and training. Scientists provided insights into the technical aspects of soil amendment, field application methods, and expected agronomic benefits. A dedicated interactive session was held to address farmers' queries and concerns, ensuring that their practical challenges and expectations were considered in the project's execution.

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Fig. 20. Launching of project SAFAR at ICAR CRRI

World Soil Day-2023

ICAR-Central Rice Research Institute, Cuttack celebrated the "World Soil Day and Awareness Training" on theme "Soil and Water: Source of Life" under the project SAFAR on 5 December 2023. The meeting was attended by nearly 60 participants including farmers, farmwomen, scientists and students. Prof. K.K. Rout, Former Dean, OUAT, Bhubaneswar graced the occasion as chief guest and guest speaker of the function. Participants received training on soil sampling, and team of scientists interacted with them. Dr. Sangita Mohanty enlightened farmers about the importance of soil health and how it is related to a healthy society. While addressing the issue of soil health management, Dr. Nayak emphasized on the role of importance of soil test based nutrient application. Chief guest Prof. K.K. Rout spoke on the importance of soil as a source of life, land degradation in India, issues related to the physical health of soil, and the advantages of compost and vermi-compost in enhancing soil health.

World Environment Day 2024

ICAR-Central Rice Research Institute, Cuttack conduct a workshop and training program for celebration of "Mission LiFE aligned with the theme of World Environment Day 2024" on 'Managing Heavy Metal in Rice Farming: Sustainable Strategies for Environmental Health' in hybrid mode at ICAR-CRRI Cuttack under the project SAFAR on 3.05. 2024. Dr N K Dhal, Head and Chief Scientist, Environment and Sustainability department, IMMT, Bhubaneswar graced the occasion as chief guest and guest speaker of the function. Dr MM Rahman, Associate Professor, School of Environmental and Life Sciences, University of Newcastle, Australia also joined the occasion virtually as guest speaker of the function. The meeting was attended by nearly

60 participants including guests from premium research institutes, industries, startups FPOs and Farmers from Angul, Dhenkanal, Jharsuguda, Jajpur and Cuttack. Soil health Cards and paddy seeds of ICAR-CRRI, Cuttack have been distributed among the farmers by the honorable Director Dr AK Nayak, ICAR-CRRI.

Fig. 21. World soil day celebration under project SAFAR at ICAR CRRI, Cuttack, Odisha (05th December, 2023).

Fig. 22. World Environmental day celebration under project SAFAR at ICAR CRRI, Cuttack, Odisha (03rd June, 2024).

9. Commercialization of EcoLime+

ICAR-CRRI has granted M/s RM Agrico Private Limited a non-exclusive license to produce, manufacture, sell, and distribute the **EcoLime+** [Slag based, value-added Products] developed by ICAR-CRRI, Cuttack. This license authorizes RM Agrico Pvt. Ltd. to commercialize the technology for acid soil management. Under this agreement, ICAR-CRRI recognizes RM Agrico Private Limited as its authorized producer of the mentioned technology for a period of three years, starting from the date of execution of the Memorandum of Understanding (MoU), which has been duly signed by both parties. **(Annexure-01).**

This agreement marks a significant step in commercialization and scaling up the widespread adoption product and ensuring its availability to farmers for sustainable acid soil management across India.

Fig. 23. Exchanging Agreement between ICAR-CRRI and RM Agrico Pvt. Ltd. for producing EcoLime^{+} by the later

10. Summary and way forwards

The **EcoLime**$^{+}$ initiative represents a ground breaking "Waste to Wealth" approach, addressing two critical challenges simultaneously *viz.,* the safe disposal of industrial by-products like fly ash and basic slag and the reclamation of acid soils for sustainable agriculture. By transforming these waste materials into a scientifically validated, eco-friendly, and cost-effective soil amendment; this project provides a long-term solution to soil acidity management while ensuring the productive utilization of industrial waste.

The field trials conducted across multiple locations have demonstrated remarkable improvements in soil health and crop productivity. The application of **EcoLime**$^{+}$ led to an increase in soil pH, yield enhancement in rice, and increase in pulse productivity, proving its effectiveness in real farming conditions. Additionally, its role in reducing greenhouse gas emissions further highlights its environmental sustainability. The products affordability, owing to the easy availability of raw materials as industrial by-products, makes it accessible to a large number of farmers, providing a low-cost yet highly effective solution for acid soil management.

For farmers, **EcoLime**$^{+}$ offers a practical, scalable, and economically viable method to improve soil fertility, increase productivity, and enhance income. For policymakers, this technology presents an opportunity to integrate sustainable soil management practices into existing agricultural development programs. Moving forward, efforts will focus on expanding production through partnerships with FPOs, startups, and industries, while advocating for policy support and government incentives under soil health improvement schemes. The inclusion of **EcoLime**$^{+}$ in state and national agricultural programs can further accelerate its adoption, ensuring long-term sustainability and a significant positive impact on Indian agriculture.

11. Media coverage: The various activities conducted under the project, including meetings, demonstration programs, and farmers' training sessions, received extensive media coverage at the local, state, and national levels. The initiatives were widely featured in both television broadcasts and newspapers, highlighting the project's impact on acid soil management, sustainable agriculture, and the innovative use of industrial by-products. The media coverage played a crucial role in raising awareness among farmers, policymakers, and stakeholders, promoting the adoption of **EcoLime^{+}** (Photo plate no 8).

12. Other contributors and special acknowledgment

Project Staff	
Young Professional - I	**Responsibility**
1. Rajalaxmi Sahoo	Soil and Plant sample analysis
2. Sunil Kumar Sethi	Farmers field activities, data collection, farmers field digitization using Google Earth and QGIS Software.
3. Kashyapi Kamalini	Soil and Plant sample analysis
4. Shubhendu Garanayak	Farmers field activities and data collection
5. Chandan Kumar Sahoo	Farmers field digitization using Google Earth and QGIS Software, soil sample analysis
Graduate Assistant	**Responsibility**
1. Anuj Bibek Sahoo	Farmers field digitization using Google Earth and QGIS Software; soil sample analysis
State Govt., Industrial and Other Staffs	
1. Shri Basant Kumar Dey	JDA, QC& E, Govt. of Odisha
2. Mr. B K Behera	State Pollution Control Board, Odisha
3. Mr. Santosh Kumar Pattajoshi	Environment Management Dept. TATA Steel Ltd., Meramandali.
4. Mr. Ghosal	Senior Area Manager, IDMD operations. TATA Steel Ltd., Meramandali.
5. Mr. Hari	Senior Area Manager, IDMD operations. TATA Steel Ltd., Meramandali.

13. References

- Dixit S, Mishra PK, Muthukumar M, Reddy KM, Padhee AK and Mishra A (Eds.). 2020. Mapping the nutrient status of Odisha's soils. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Department of Agriculture, Government of Odisha. 342 pp.
- Maji AK, Reddy OGP and Sarkar D. 2012. Acid Soils of India – Their Extent and spatial distribution. NBSS Publication No. 145. NBSS&LUP, Nagpur. 138 pp.
- Thakuria D, Hazarika S and Krishnappa R. 2016. Soil acidity and management options. Indian Journal of Fertilisers 12 (12): 40–56.
- Mishra, A., & Sarangi, J. (2013). Soils of Cuttack District. *Odisha Review*, 51-57. https://magazines.odisha.gov.in/Orissareview/2013/jun/engpdf/52-58.pdf

- Nayak, R. K., Manchala, M., Jena, B., Das, J., Mohanty, S., & Shukla, A. K. (2022). Crop Production Constraints Related to Secondary and Micro Nutrients in the Soils of Jajpur District, Odisha. https://isslup.in/wp-content/uploads/2022/06/6-1.pdf
- Jena, Nirmal Kumar, Antaryami Mishra, Amitabh Mahapatra, and Mamata Tripathy. "Geo-referenced appraisal of spatial variability of soil properties in Jharsuguda district of Odisha, India." *IJCS* 11, no. 4 (2023): 01-07.
- Directorate of Agriculture, Odisha, 2020. https://agri.odisha.gov.in/sites/default/files/2023-03/Five%20Decades%20of%20Odisha%20Agriculture%20Statistics_compressed.pdf

Other online references:

- https://jharsuguda.odisha.gov.in/about-district/about-us#:~:text=The%20soil%20of%20the%20riverbanks,judged%20through%20its%20natural%20resources.
- https://cuttack.odisha.gov.in/about-district/about-us#:~:text=The%20soil%20of%20the%20riverbanks,judged%20through%20its%20natural%20resources.

14. Photo Gallery

Plate 1. Formal meetings with different industries and project discussion

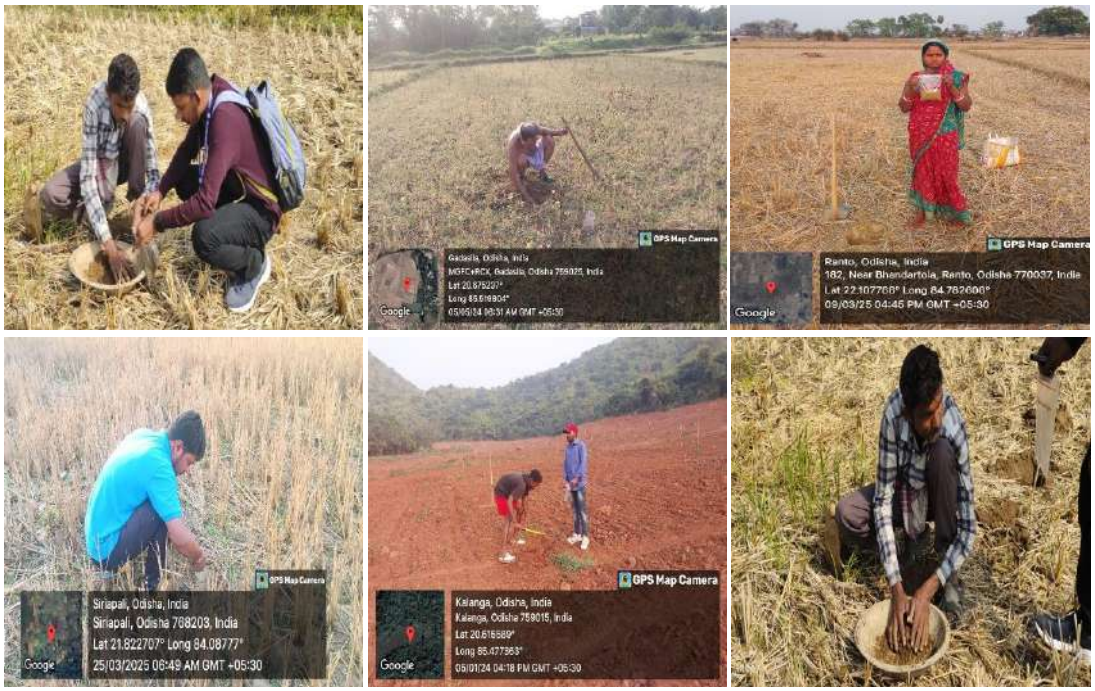


Plate 2. Soil sample collection from different farmer's field at different districts

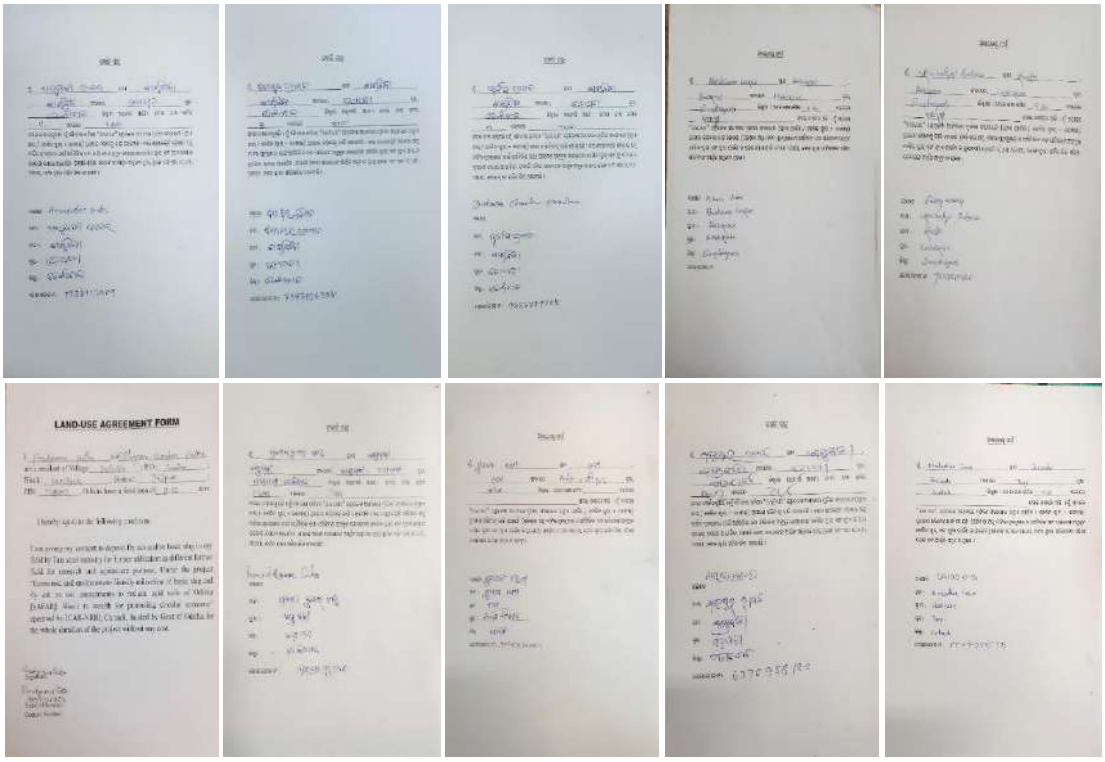


Plate 3: Consent from different farmers for application of EcoLime^{+}

Plate 4. Laboratory analysis of basic slag-based value-added products at ICAR-CRRI, Cuttack

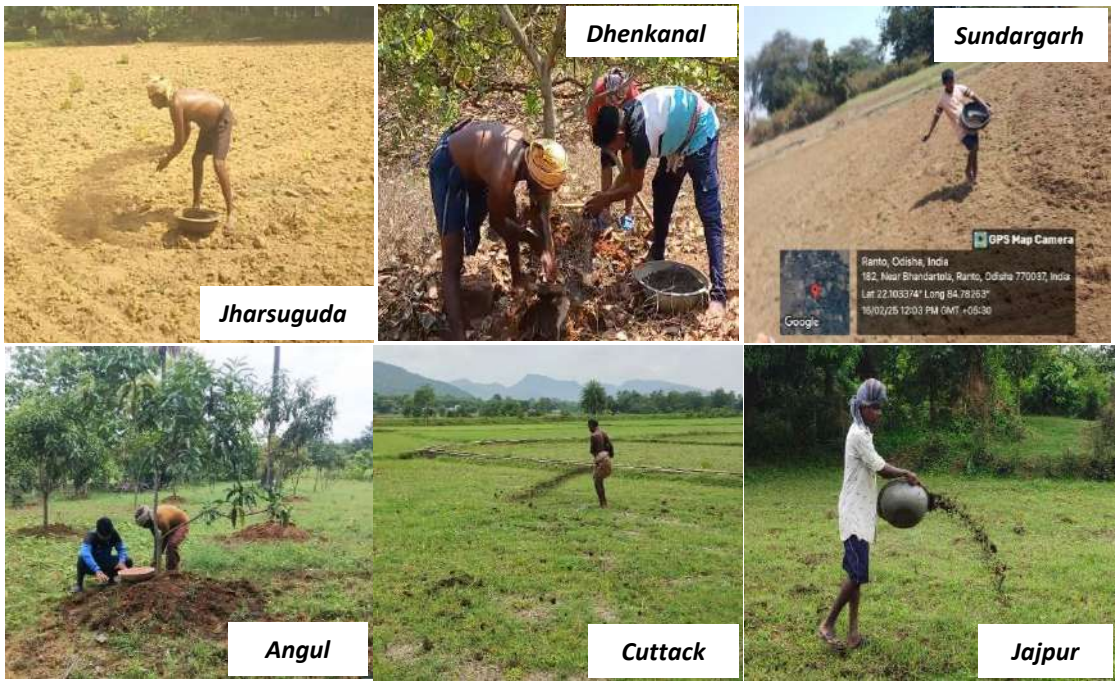


Plate 5a. Application of EcoLime^{+} at farmer's field

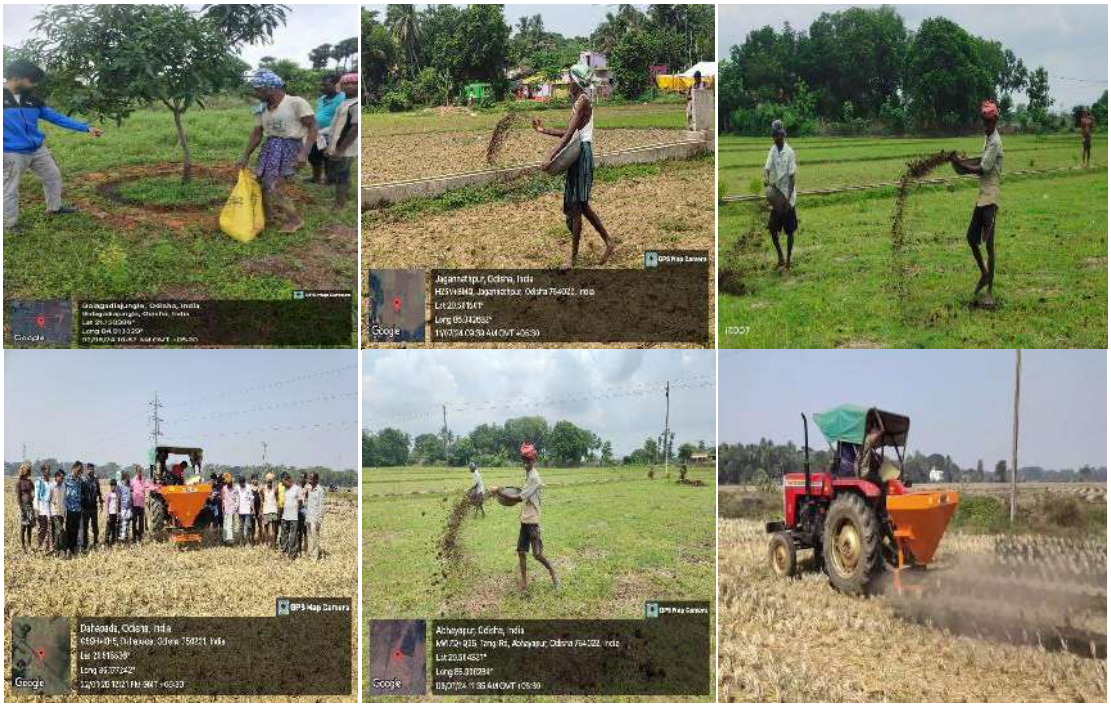


Plate 5b. Application of EcoLime^{+} at farmer's field

Plate 6: Intermediate data collections from farmer's fields

Plate 7: Farmers training under project SAFAR

Plate 8. Media coverage under project SAFAR

Annexure - 1

Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

For commercialization of the technology "Basic Slag Based value added products utilization" developed by ICAR-NRRI, Cuttack

This MoU is made on this 18.09.2024, at Cuttack, Odisha, India

BETWEEN

ICAR-NATIONAL RICE RESEARCH INSTITUTE, Bidyadharpur, Cuttack - 753006, Odisha, a constituent of Indian Council of Agricultural Research (ICAR), New Delhi, a Society registered under the Societies Registration Act 1860, which terms shall include its successors, assignees etc. (hereinafter called 'LICENSOR')

AND

M/s RM Agrico Private Limited, Block EP & GP, Plot No. E2-2/1, Infinity (1) Lagoon, Sector V, Salt Lake, Kolkata- 700091, which terms shall include its successors, assignees etc. (hereinafter called the 'LICENSEE')

MEMORANDUM OF UNDERSTANDING

For Mass production of Basic slag (steel industrial wastes) and Fly ash (thermal industrial wastes) based value-added products,Between(ICAR – National Rice Research Institute, Cuttack, Odisha &Smart farming- Bio refining, Bhubaneswar, Odisha. (EAP 411)

This Memorandum of Understanding (MoU) is signed on this date the .....2024 between the DIRECTOR, ICAR - NATIONAL RICE RESEARCH INSTITUTE, Indian Council of Agricultural Research, Cuttack, Odisha 753 006 INDIA, (hereafter referred to as the "First Party") which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns, as represented by the Director, ICAR-NRRI, Cuttack.

AND

Smart farming- Bio Refining, Bhubaneswar, Odisha (hereafter referred to as the "Second Party") which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns, as represented by Smart farming- Bio refining, Bhubaneswar, Odisha.

WHEREAS the first party is involved in Rice research and working in research on the reclamation of acid soils through the utilization of basic slag (steel industrial wastes) and fly ash (thermal industrial wastes) based value- added products besides rice research on a state Government of Odisha funded project titled 'Economic and environment-friendly Utilization of Basic-Slag and Fly Ash as Soil Amendments to Reclaim Acid Soils of Odisha [SAFAR]: Waste to Wealth for Promoting Circular Economy' (EAP 411) aimed at acid soils reclamation under paddy cultivation in the districts of Cuttack, Dhenkanal, Keonjhar, Jajpur, Angul and Jharsuguda for enhancing

MEMORANDUM OF UNDERSTANDING

For mass production and marketing of fly-ash or basic slag based soil amendments, compost and bio-fertilizers under the Project entitled "Economic and environment-friendly Utilization of Basic Slag und Fly-ash as Soil Amendments to Reclaim Acid Soils of Odisha [SAFAR]: Waste to Wealth for Promoting Circular Economy" (EAP-411)

Between

ICAR-National Rice Research Institute,Cuttack,Odisha

&

Potential entrepreneur (Subhapriya Mohanty) founder of ECOGROW Solutions, Dhenkanal, Odisha.

This Memorandum of Understanding (MoU) is signed on this date 02.08.2024 between

The DIRECTOR, ICAR – National Rice Research Institute, NATIONAL RICE RESEARCH INSTITUTE, a constituent unit of Indian Council of Agricultural Research, Cuttack, Odisha-753006, INDIA, (hereafter referred to as the "First Party-ICAR-NRRI") which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns, as represented by the Director, ICAR-NRRI, Cuttack.

AND

Subha priya mohanty

MEMORANDUM OF UNDERSTANDING

for

Mass production of Basic slag (steel industrial wastes) and Fly ash (thermal industrial wastes) based value-added products

Between

ICAR - National Rice Research Institute, Cuttack, Odisha

&

Biotez Agrinovation Pvt. Ltd., Rourkela, Odisha

This Memorandum of Understanding (MoU) is signed on this date the 10.10.2023 between the DIRECTOR, ICAR - NATIONAL RICE RESEARCH INSTITUTE, Indian Council of Agricultural Research, Cuttack, Odisha 753 006 INDIA, (hereafter referred to as the "First Party") which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns, as represented by the Director, ICAR-NRRI, Cuttack.

AND

Biotez Agrinovation Pvt. Ltd., Rourkela, Odisha (hereafter referred to as the "Second Party") which expression shall, unless it be repugnant to the context or meaning thereof, be deemed to mean and include its successors and permitted assigns, as represented by Biotez Agrinovation Pvt. Ltd, Odisha.

Whereas the first party is involved in research on the reclamation of acid soils through the utilization of basic slag (steel industrial wastes) and fly ash (thermal industrial wastes) based value-added products besides rice research.

Whereas the second party is a registered company engaged in the production and commercialization of basic slag-based products, organic manure, and bio-fertilizers.

Cont..P/2

Annexure – 2.1

Clearance Certificate from State Pollution Control Board on 20.04.24 to Aarati Steel, Vedanta, NTPA and Tata Steel from Supply of Fly ash.

EPABX : 2561909/2562847
E-mail: cto@17category@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA
[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

No. 5952 / IND-I-CON- Misc- 1682 Date 20-04-2024

By Speed Post / Email
environment@aartisteelsltd.com
sanghamitra.das@aartisteelsltd.com

To
The Director,
M/s. Aarti Steels Ltd.,
At - Ghantikhal, Po - Mahakalbasta,
Via - Athagarh, Dist - Cuttack)

Sub : **Supply of fly ash / basic slag to ICAR- National Rice Research Institute (NRRI), Cuttack for execution of research project –Reg.**

Ref : Letter received from ICAR, Cuttack on dtd. 06.03.2024

Sir,

With reference to the above, this is to say that ICAR- National Rice Research Institute (NRRI), Cuttack has recently being entrusted with a project title "Economic & Environment- Friendly Utilization of basic Slag and Fly ash as soil amendments to reclaim acid soils of Odisha (SAFAR), Waste to Wealth for promoting circular economy" by the Govt. of Odisha. ICAR will sources these materials from various thermal power plants and steel industries located in Odisha.

In view of above, after careful consideration and as per guidelines laid in the fly ash notification vide S.O. 5481(E), dtd. 31.12.2021 and amended thereafter & CPCB guidelines on management of pyro-metallurgical Slags (iron & Steel Slags), December, 2023 , you are hereby requested to supply the desired quantity of fly ash / basic slag from your industry to ICAR-NRRI, Cuttack for conducting the above research project with an intimation to the Board.

Yours faithfully,
MEMBER SECRETARY

Memo No. 5953 /dtd. 20-04-2024 By Email : pratap162001@gmail.com
Copy forwarded to Dr. Pratap Bhattacharyya, Head & Principal Scientist, Corp Production Division, ICAR – National Rice Research Institute (NRRI), Cuttack – 753 006 for information. He is requested to contact the above industry for procurement of fly ash / basic slags of desired quantity for the research purposes.

CHIEF ENV. ENGINEER

Memo No. 5954 /dtd. 20-04-2024 By Email :
Copy forwarded to the Regional Officer, SPC Board, Cuttack, Odisha for information and necessary action.

CHIEF ENV. ENGINEER

OSPCB-CTO-MISC-0022-2024/4/2024

EPABX : 2561909/2562847
E-mail: cto@17category@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA
[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

No. 5941 / IND-I-CON- Misc- 1682 Date 20-04-2024

By Speed Post / Email
subrata.de@nspcl.co.in
manak.mathur@nspcl.co.in

To
The General Manager,
M/s. NTPC -SAIL Power Company Pvt. Ltd., (CPP-II),
Administrative Building, RSP Complex,
Rourkela, Dist - Sundargarh

Sub : **Supply of fly ash to ICAR- National Rice Research Institute (NRRI), Cuttack for execution of research project –Reg.**

Ref : Letter received from ICAR, Cuttack on dtd. 06.03.2024

Sir,

With reference to the above, this is to say that ICAR- National Rice Research Institute (NRRI), Cuttack has recently being entrusted with a project title "Economic & Environment- Friendly Utilization of basic Slag and Fly ash as soil amendments to reclaim acid soils of Odisha (SAFAR), Waste to Wealth for promoting circular economy" by the Govt. of Odisha. ICAR will sources these materials from various thermal power plants and steel industries located in Odisha.

In view of above, after careful consideration and as per guidelines laid in the fly ash notification vide S.O. 5481(E), dtd. 31.12.2021 and amended thereafter, you are hereby requested to supply the desired quantity of fly ash from your industry to ICAR-NRRI, Cuttack for conducting the above research project with an intimation to the Board.

Yours faithfully,
MEMBER SECRETARY

Memo No. 5942 /dtd. 20-04-2024 By Email : pratap162001@gmail.com
Copy forwarded to Dr. Pratap Bhattacharyya, Head & Principal Scientist, Corp Production Division, ICAR – National Rice Research Institute (NRRI), Cuttack – 753 006 for information. He is requested to contact the above industry for procurement of fly ash of desired quantity for the research purposes.

CHIEF ENV. ENGINEER

Memo No. 5943 /dtd. 20-04-2024 By Email :
Copy forwarded to the Regional Officer, SPC Board, Rourkela, Odisha for information and necessary action.

CHIEF ENV. ENGINEER

OSPCB-CTO-MISC-0022-2024/2/2024

EPABX : 2561909/2562847
E-mail: cto@17category@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA
[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

No. 5946 / IND-I-CON- Misc- 1682 Date 20-04-2024

By Speed Post / Email
santosh.pattajoshi@tatasteel.com
anoop.srivastava@tatasteel.com

To
The Vice President, (Operation),
M/s. Tata Steel Ltd., [Formerly Tata Steel BSL Ltd),
At: Narendrapur PO: Kusupanga Via: Meramandali
Dist.: Dhenkanal Pin.759121, Odisha

Sub : **Supply of fly ash / basic slag to ICAR- National Rice Research Institute (NRRI), Cuttack for execution of research project –Reg.**

Ref : Letter of ICAR-NRRI, Cuttack on dtd. 06.03.2024

Sir,

With reference to the above, this is to say that ICAR- National Rice Research Institute (NRRI), Cuttack has recently being entrusted with a project title "Economic & Environment- Friendly Utilization of basic Slag and Fly ash as soil amendments to reclaim acid soils of Odisha (SAFAR), Waste to Wealth for promoting circular economy" by the Govt. of Odisha. ICAR will sources these materials from various thermal power plants and steel industries located in Odisha.

In view of above, after careful consideration and as per guidelines laid in the fly ash notification vide S.O. 5481(E), dtd. 31.12.2021 and amended thereafter & CPCB guidelines on management of Pyro-Metallurgical Slags (Iron & Steel Slags), December, 2023 , you are hereby requested to supply the desired quantity of fly ash / basic slag from your industry to ICAR-NRRI, Cuttack for conducting the above research project with an intimation to this Board.

Yours faithfully,
MEMBER SECRETARY

Memo No. 5947 /dtd. 20-04-2024 By Email : pratap162001@gmail.com
Copy forwarded to Dr. Pratap Bhattacharyya, Head & Principal Scientist, Corp Production Division, ICAR – National Rice Research Institute (NRRI), Cuttack – 753 006 for information. He is requested to contact the above industry for procurement of fly ash / basic slags of desired quantity for the research purposes.

CHIEF ENV. ENGINEER

Memo No. 5948 /dtd. 20-04-2024 By Email :
Copy forwarded to the Regional Officer, SPC Board, Angul, Odisha for information and necessary action.

CHIEF ENV. ENGINEER

OSPCB-CTO-MISC-0022-2024/5/2024

EPABX : 2561909/2562847
E-mail: cto@17category@ospcboard.org
Website: www.ospcboard.org

STATE POLLUTION CONTROL BOARD, ODISHA
[DEPARTMENT OF FOREST, ENVIRONMENT & CLIMATE CHANGE, GOVERNMENT OF ODISHA]
Paribesh Bhawan, A/118, Nilakantha Nagar, Unit – VIII
Bhubaneswar – 751 012, INDIA

No. 5938 / IND-I-CON- Misc- 1682 Date 20-04-2024

By Speed Post / Email
amitkumartyagi@vedanta.co.in

To
The Chief Operating Officer,
M/s. Vedanta Ltd., (Smelter, CPP & IPP)
At/Po - Bhurkhamunda,
Dist - Jharsuguda - 768202

Sub : **Supply of fly ash to ICAR- National Rice Research Institute (NRRI), Cuttack for execution of research project –Reg.**

Ref : Letter received from ICAR, Cuttack on dtd. 06.03.2024

Sir,

With reference to the above, this is to say that ICAR- National Rice Research Institute (NRRI), Cuttack has recently being entrusted with a project title "Economic & Environment- Friendly Utilization of basic Slag and Fly ash as soil amendments to reclaim acid soils of Odisha (SAFAR), Waste to Wealth for promoting circular economy" by the Govt. of Odisha. ICAR will sources these materials from various thermal power plants and steel industries located in Odisha.

In view of above, after careful consideration and as per guidelines laid in the fly ash notification vide S.O. 5481(E), dtd. 31.12.2021 and amended thereafter, you are hereby requested to supply the desired quantity of fly ash from your industry to ICAR-NRRI, Cuttack for conducting the above research project with an intimation to the Board.

Yours faithfully,
MEMBER SECRETARY

Memo No. 5939 /dtd. 20-04-2024 By Email : pratap162001@gmail.com
Copy forwarded to Dr. Pratap Bhattacharyya, Head & Principal Scientist, Corp Production Division, ICAR – National Rice Research Institute (NRRI), Cuttack – 753 006 for information. He is requested to contact the above industry for procurement of fly ash of desired quantity for the research purposes.

CHIEF ENV. ENGINEER

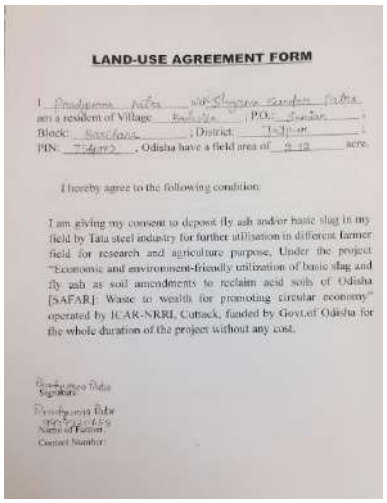
Memo No. 5940 /dtd. 20-04-2024 By Email :
Copy forwarded to the Regional Officer, SPC Board, Jharsuguda, Odisha for information and necessary action.

CHIEF ENV. ENGINEER

OSPCB-CTO-MISC-0022-2024/1/2024

Annexure – 2.2

Land owner's Consent form



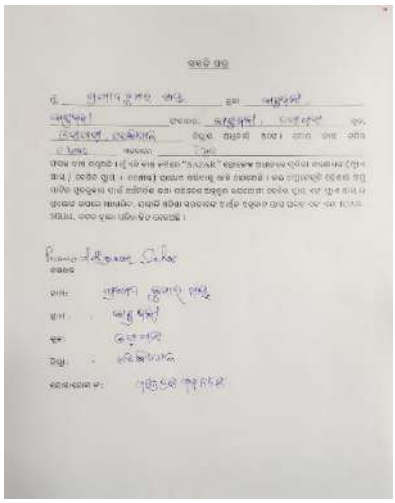
LAND-USE AGREEMENT FORM

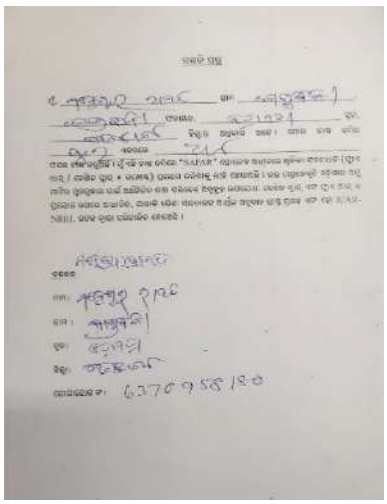
I ... son/Shyama Sundar Sahu
am a resident of Village ... ; P.O.: ... ;
Block: ... ; District: ... ;
PIN: ... ; Odisha have a field area of ... acre.

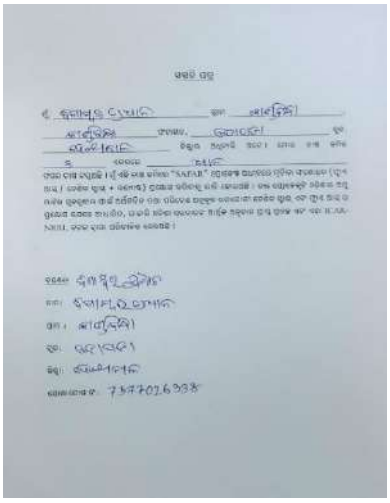
I hereby agree to the following condition:

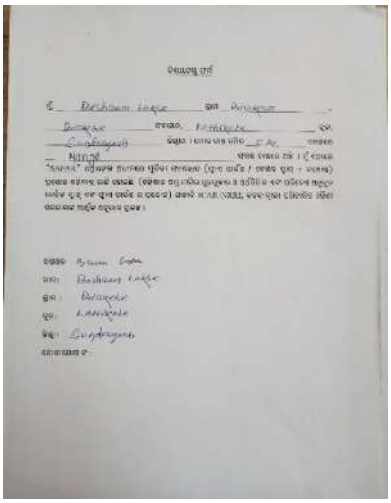
I am giving my consent to deposit fly ash and/or basic slag in my field by Tata steel industry for further utilisation in different farmer field for research and agriculture purpose. Under the project "Economic and environment-friendly utilization of basic slag and fly ash as soil amendments to reclaim acid soils of Odisha [SAFAR]: Waste to wealth for promoting circular economy" operated by ICAR-NRRI, Cuttack, funded by Govt.of Odisha for the whole duration of the project without any cost.

Signature
Name of Farmer
Contact Number:









Annexure -3

Number of Soil sample collected with Basic details

SL No.	Sample ID	Farmer's NILme	Village	Block	District	PIN code	Adhar no	Mobile No.	Latitude	Longitude	Sample collection
1	NRRI_SAFAR_Jaj_BAD-1	ଚତୁର ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	7681859031	20.734341	85.970205	18-12-23
2	NRRI_SAFAR_Jaj_BAD-2	ଲକ୍ଷ୍ମୀଧର ଦାସ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	9337811717	20.703272	85.977227	18-12-23
3	NRRI_SAFAR_Jaj_BAD-3	ଧନେଶ୍ୱର ନାଏକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	511441678493	7504579322	20.700974	85.974354	18-12-23
4	NRRI_SAFAR_Jaj_BAD-4	ନବୁନ ରାଉତ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	9853718298	20.701368	85.975311	18-12-23
5	NRRI_SAFAR_Jaj_BAD-5	ଧୃବ ନାଏକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	433810981393	9556900902	20.701368	85.975311	18-12-23
6	NRRI_SAFAR_Jaj_BAD-6	ଗୋଲଖ ଦାସ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	9938309209	20.706284	85.962864	18-12-23
7	NRRI_SAFAR_Jaj_BAD-7	ଚଟି ନାଏକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	554838743188	8249102018	20.706284	85.962864	18-12-23
8	NRRI_SAFAR_Jaj_BAD-8	ତୁନସୀ ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	723141155238	8455045117	20.702410	85.972120	19-12-23
9	NRRI_SAFAR_Jaj_BAD-9	ଭୁନ୍ତ ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	8455044247	20.708626	85.967652	19-12-23
10	NRRI_SAFAR_Jaj_BAD-10	ବିଷ୍ଣୁ ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	359402571070	9040273142	20.708626	85.967652	19-12-23
11	NRRI_SAFAR_Jaj_BAD-11	ଦୁର୍ଯ୍ୟୋଧନ ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	433810981393	7437062441	20.708626	85.967652	19-12-23
12	NRRI_SAFAR_Jaj_BAD-12	ହାମିନୀ ନାୟକ	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	926639633089	8984773589	20.703183	85.973396	19-12-23
13	NRRI_SAFAR_Jaj_BAD-13	ବିଜୟ କୁମାର ମହାନ୍ତି	ବାହରିଗଡ	ବଡ଼ଚଣା	ଯାଜପୁର	754082	NIL	8018763115	20.693216	85.944660	19-12-23
14	NRRI_SAFAR_Jaj_BAD-14	ଚିତ୍ତନ୍ୟ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	6372857984	20.715971	86.060448	20-12-23
15	NRRI_SAFAR_Jaj_BAD-15	ଶିବରାମ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	7846876323	20.715971	86.060448	20-12-23
16	NRRI_SAFAR_Jaj_BAD-16	ସୁମିତା ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9348400432	20.716671	86.058536	20-12-23
17	NRRI_SAFAR_Jaj_BAD-17	ବିନୁନ ବଳାଦା	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	6369818767	20.716671	86.058536	20-12-23
18	NRRI_SAFAR_Jaj_BAD-18	ସୁରେଶ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9776201992	20.715971	86.060448	20-12-23
19	NRRI_SAFAR_Jaj_BAD-19	ରଘୁନାଥ ତ୍ରିପାଠୀ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9937628481	20.716671	86.058568	21-12-23
20	NRRI_SAFAR_Jaj_BAD-20	ବିକାସ ନାୟକ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9437650147	20.734258	86.047065	21-12-23
21	NRRI_SAFAR_Jaj_BAD-21	ପୁରୁଷୋତ୍ତମ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	6370010335	20.734258	86.047065	21-12-23
22	NRRI_SAFAR_Jaj_BAD-22	ଜୀତା ସାରିଦ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9937323312	20.734258	86.047065	21-12-23
23	NRRI_SAFAR_Jaj_BAD-23	ହାତିବନ୍ଧୁ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	9861729958	20.734258	86.047065	21-12-23
24	NRRI_SAFAR_Jaj_BAD-24	ସୁର୍ଯ୍ୟ ସାହୁ	ଖରମଙ୍ଗି	ବଡ଼ଚଣା	ଯାଜପୁର	755044	NIL	7873666378	20.734258	86.047065	21-12-23
25	NRRI_SAFAR_Jaj_BAD-25	ସରସ୍ୱତୀ ସିଂହ	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	657618037713	9861853372	20.734258	86.047065	28-12-23
26	NRRI_SAFAR_Jaj_BAD-26	ଟିଲୋତ୍ତମ ସିଂହ	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	756620263958	9861853372	20.734258	86.047065	28-12-23
27	NRRI_SAFAR_Jaj_BAD-27	ରାମଚନ୍ଦ୍ର ସିଂହ	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	662268894037	NIL	20.734258	86.047065	28-12-23
28	NRRI_SAFAR_Jaj_BAD-28	ପ୍ରାଣ କୃଷ୍ଣ ଦେୱରା	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	666622737428	9040276713	20.735072	86.017738	28-12-23
29	NRRI_SAFAR_Jaj_BAD-29	ଗଣେଶ୍ୱର ଦେୱରା	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	235914483098	9853178850	20.735072	86.017738	28-12-23
30	NRRI_SAFAR_Jaj_BAD-30	ଧରଣୀ ଦେୱରା	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	695618541514	9348749912	20.735072	86.017738	28-12-23
31	NRRI_SAFAR_Jaj_BAD-31	ପ୍ରମୋଦ ଦେୱରା	ଗତିମପୁର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	309888076944	9178705028	20.730610	86.017738	29-12-23
32	NRRI_SAFAR_Jaj_BAD-32	ସୁବଳ ବେହେରା	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	883304665272	8018024643	20.730610	86.017738	28-12-23
33	NRRI_SAFAR_Jaj_BAD-33	ଦଇତରି ବେହେରା	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	356597877317	7077989305	20.696400	85.985522	29-12-23
34	NRRI_SAFAR_Jaj_BAD-34	ରଞ୍ଜନ ମହାନ୍ତି	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	738968483937	8117815254	20.701837	85.979460	29-12-23
35	NRRI_SAFAR_Jaj_BAD-35	ଚନ୍ଦ୍ରଧର ବେହେରା	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	967456617725	9348533217	20.701837	85.979460	29-12-23
36	NRRI_SAFAR_Jaj_BAD-36	ପ୍ରତୀର ଦାସ	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	381372695063	7751944570	20.171837	85.979460	29-12-23
37	NRRI_SAFAR_Jaj_BAD-37	ଶିଶିର ଦାସ	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	285305605383	7751944570	20.704097	85.980736	29-12-23
38	NRRI_SAFAR_Jaj_BAD-38	ନବୀନ ସାମଲ	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	936842632755	8984421196	20.704097	85.980736	29-12-23
39	NRRI_SAFAR_Jaj_BAD-39	କରୁଣାକର ବେହେରା	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	430552831562	9583845968	20.701837	85.979460	29-12-23
40	NRRI_SAFAR_Jaj_BAD-40	ରବତ ମହାନ୍ତି	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	447597787792	9937280023	20.696028	85.985522	29-12-23
41	NRRI_SAFAR_Jaj_BAD-41	ରବତ ମହାନ୍ତି	ଦେବୁଘର	ବଡ଼ଚଣା	ଯାଜପୁର	755044	284872600147	7815009422	20.696028	85.985522	29-12-23
42	NRRI_SAFAR_Jaj_BAD-42	ହରିହର ପ୍ରଧାନ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	395203529131	9124987684	20.714858	85.979779	5-01-24
43	NRRI_SAFAR_Jaj_BAD-43	ହୈନାଶ ଚନ୍ଦ୍ର ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	345729282055	9437314661	20.699040	85.955202	5-01-24
44	NRRI_SAFAR_Jaj_BAD-44	ବାଳକୃଷ୍ଣ ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	967894772163	969275010	20.699020	85.955202	5-01-24
45	NRRI_SAFAR_Jaj_BAD-45	ରମାକାନ୍ତ ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	961557037035	7853048113	20.791919	85.957013	5-01-24
46	NRRI_SAFAR_Jaj_BAD-46	ସନ୍ତୋଷ ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	532455828236	7328892119	20.701919	85.967013	5-01-24
47	NRRI_SAFAR_Jaj_BAD-47	ଗଙ୍ଗର୍ଦ ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	596917593041	9337491605	20.714858	85.979779	5-01-24
48	NRRI_SAFAR_Jaj_BAD-48	ଅଜିତ କୁମାର ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	806275959198	7848923460	20.714858	85.979779	5-01-24
49	NRRI_SAFAR_Jaj_BAD-49	ବଜାନି ବେହେରା	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	283971060923	6371263372	20.713408	85.965417	5-01-24
50	NRRI_SAFAR_Jaj_BAD-50	ବୁଆ ଭୋଇ	ବଡ଼ଚଣା	ଚମ୍ପାପୁର	ଯାଜପୁର	754082	733261998093	8928899363	20.699040	85.955202	5-01-24

Sl No.	Name of the farmer	Sample Number	Sample collection Date	Latitude	Longitude	Village	Block	District	PIN code	Aadhar No	Mobile No.
1	ଅଠାଇ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_01	29-12-23	20.402700	85292800	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	754031	4929 9472 6390	7064627081
2	ବୃନାବନ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_02	29-12-23	20.646136	85478353	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	754031	8452 3812 5972	9861907617
3	ଶାନ୍ତିନତା ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_03	29-12-23	20.647308	85480198	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	754031	2382 8792 5950	7855071050
4	ଜେଣ୍ଡୁଧର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_04	29-12-23	20.641599	85481222	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	754031	4606 5634 6436	7504978213
5	ତୁହକୁଳ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_05	29-12-23	20.677303	85488738	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	754031	7221 7597 7388	9937916822
6	ସୁଫଲା ମାଝୀ	NRRI_SAFAR_DNKL_OP_KB_06	29-12-23	20.678346	85493784	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	5478 6183 7860	7077086505
7	ସଂଘମିତା ଜେଣାବୀ ଦାଶ	NRRI_SAFAR_DNKL_OP_KB_07	29-12-23	20.683286	85497970	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8733 1957 1088	7077693388
8	ବିକାପ କୁମାର ଛେଳା	NRRI_SAFAR_DNKL_OP_KB_08	29-12-23	20.693278	85500800	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7826 0412 6391	9556443370
9	ସତ୍ୟ ନାରାୟଣ ପାତ୍ର	NRRI_SAFAR_DNKL_OP_KB_09	29-12-23	20.682915	85497970	ନାରିଆତିନି	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	NIL	9337909230
10	ଛୟା ଚରଣ ପାତ୍ର	NRRI_SAFAR_DNKL_OP_KB_10	29-12-23	20.692992	85500737	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	NIL	9556124820
11	ଦାଣ୍ଡି ରଣ୍ଡା ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_11	29-12-23	20.690189	85485048	ନାରିଆତିନି	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	4751 3380 4561	9337412103
12	ରମେଶ ଚନ୍ଦ୍ର ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_12	29-12-23	20.671899	85503122	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	2460 6391 0650	8895788991
13	ଅଠାଇ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_13	29-12-23	20.681989	85486678	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7903 7030 3716	9078330654
14	ହାଡିଆ ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_14	29-12-23	20.668148	85498269	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	2050 2031 6439	9668304792
15	ମନଭଧନ ବେହେରା	NRRI_SAFAR_DNKL_OP_KB_15	29-12-23	20.666250	85499165	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	3312 3812 6884	8895290242
16	ସୁରେଶ ଦେହୁରୀ	NRRI_SAFAR_DNKL_OP_KB_16	29-12-23	20.666951	85498614	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	3799 8543 5393	8114757996
17	ରୋହିତ କୁମାର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_17	29-12-23	20.662778	85500735	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8684 7023 3943	9776197774
18	ଶଙ୍କର୍ଷଣ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_18	29-12-23	20.670148	85508048	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	NIL	8249260167
19	ବାବିସୁ କୁମାର ମୋଇଲାଟ	NRRI_SAFAR_DNKL_OP_KB_19	29-12-23	20.670910	85511179	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6439 8410 9299	9337690215
20	ଦୃପିଂହ ଚରଣ ମୋଇଲାଟ	NRRI_SAFAR_DNKL_OP_KB_20	29-12-23	20.664174	85520507	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	4596 1663 3218	9437290215
21	ବିଶ୍ୱୁ ଚରଣ ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_21	29-12-23	20.671163	85513263	ଉତର କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759019	2331 0303 2618	9937334904
22	ସାଧୁ କୁମାର ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_22	29-12-23	20.671940	85503271	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	5913 6092 2293	9337524506
23	ବୁଲି ବିହରୀ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_23	29-12-23	20.670673	85513272	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8346 3588 6492	9692167237
24	ଅମିୟ ମୋଇଲାଟ	NRRI_SAFAR_DNKL_OP_KB_24	29-12-23	20.402500	85311100	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	NIL	9853643996
25	ଅଶୋକ କୁମାର ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_25	29-12-23	20.402700	85300200	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	9881 0871 3689	7504645027
26	ଅଭିରାମ ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_26	29-12-23	20.394500	85304900	ଦେବ କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759019	3287 8059 8040	8144485282
27	ବିକ୍ରିତ୍ ମୋଇଲାଟ	NRRI_SAFAR_DNKL_OP_KB_27	29-12-23	20.394500	85302100	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	5796 6186 1405	9853654601
28	ବିଶ୍ୱୁ ଚରଣ ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_28	29-12-23	20.656528	85526622	ଖୁଣ୍ଟିରି	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6600 0872 5263	9178300351
29	ସାମାରା କୁମାର ପାତ୍ର	NRRI_SAFAR_DNKL_OP_KB_29	29-12-23	20.681486	85486304	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6036 8902 0752	8658620727
30	ସୁରେଶ ଚନ୍ଦ୍ର ନାଥ	NRRI_SAFAR_DNKL_OP_KB_30	29-12-23	20.665372	85523726	ଭର୍ଦ୍ଦପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8974 4852 5535	7978177071
31	ଅଶ୍ୱିନି କୁମାର ପଟ୍ଟନାୟକ	NRRI_SAFAR_DNKL_OP_KB_31	29-12-23	20.666898	85558247	ବେଲଗଣ୍ଡିଆ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	5142 2239 1293	8455971293
32	ହାଡିବନ୍ଧୁ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_32	29-12-23	20.668861	85498717	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7443 2885 0019	9777077376
33	ରାଜକିଶୋର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_33	29-12-23	20.665498	85499802	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7783 3935 8027	708794514
34	ଛୟାଛାତ୍ର ମାଝୀ	NRRI_SAFAR_DNKL_OP_KB_34	29-12-23	20.682001	85486478	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8670 8136 9080	9938472902
35	ସୁଧାଂଶୁ ଶେଖର ତ୍ରିପାଠୀ	NRRI_SAFAR_DNKL_OP_KB_35	29-12-23	20.679650	85495158	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7648 7970 0753	7327863818
36	ସୁରେଶ ଚନ୍ଦ୍ର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_36	29-12-23	20.668918	85502800	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6680 8604 8243	7077539326
37	ମୋଘତ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_37	29-12-23	20.659904	85496098	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8620 1992 6261	9439797934
38	ବିକ୍ରିତ୍ ପାତ୍ର	NRRI_SAFAR_DNKL_OP_KB_38	29-12-23	20.674909	85496241	ବଡଗାଙ୍ଗପୁର	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	9715 1992 0700	9937846070
39	ବଳରାମ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_39	29-12-23	20.656528	85526622	ବିବଳ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	8615 1100 4443	9090429065
40	ଲୁନି ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_40	29-12-23	20.656528	85526622	ବିବଳ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	5975 3267 0516	9090429065
41	ରାଉତ ଛତ୍ର ଦାସ	NRRI_SAFAR_DNKL_OP_KB_41	29-12-23	20.656528	85526622	ବିବଳ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	NIL	9178286647
42	ନଦାଇର ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_42	29-12-23	20.652908	85540385	କେରେବିସୁତା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759013	3034 2518 0104	8847806661
43	ବଟଖଣ୍ଡା ସାହୁ	NRRI_SAFAR_DNKL_OP_KB_43	29-12-23	20.652896	85546608	କେରେବିସୁତା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759013	7112 8839 5644	8847806661
44	ବୃନାବନ ପୁଷ୍ଟି	NRRI_SAFAR_DNKL_OP_KB_44	29-12-23	20.655790	85537807	କେରେବିସୁତା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759013	9862 2571 1869	9337997830
45	ସୁଧାସିନ୍ଧି ମଦଲଣା	NRRI_SAFAR_DNKL_OP_KB_45	29-12-23	20.658935	85535537	ଖୁଣ୍ଟିରି	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	9904 2102 3069	9438838457
46	ଶିବ ନାରାୟଣ ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_46	29-12-23	20.669115	85525979	ଛତିଆ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6837 6924 2288	9861103722
47	ପୁଷ୍ପଲତା ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_47	29-12-23	20.678696	85531128	ଛତିଆ	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	6837 5668 2282	9348297284
48	ସୁଧାଂଶୁ ଶେଖର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_48	29-12-23	20.648596	85450775	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	4863 9726 9045	7008795414
49	ଶରତ ଚନ୍ଦ୍ର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_49	29-12-23	20.646136	85478353	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	7478 6444 0288	7609857161
50	ପ୍ରକାଶ କୁମାର ରାଉତ	NRRI_SAFAR_DNKL_OP_KB_50	29-12-23	20.660580	85796599	କାଣ୍ଡବିଳା	ଉଦୟପୁର	ଢେଙ୍କାନାଳ	759025	2705 6189 2716	8327723243

SL No.	Sample number	Farmers Name	Village	Block	District	Pincode	Adhar number	Mobile Number	mple collection Da	Latitude	Longitude
1	NRRI_SAFAR_JSG_KOL_SP_1	ବିନଦ୍ଧୁ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4064 9655 5802	9938217942	5-12-23	21.82323	84.08728
2	NRRI_SAFAR_JSG_KOL_SP_2	ଧନୁର୍ଜୟ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	3045 3737 2957	9583670569	5-12-23	21.82199	84.08838
3	NRRI_SAFAR_JSG_KOL_SP_3	ସନାତନ ନାଏକ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8191 4204 3790	9040625313	5-12-23	21.82487	84.08734
4	NRRI_SAFAR_JSG_KOL_SP_4	ଗୋପବନ୍ଧୁ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4752 1620 3348	6372286097	5-12-23	21.82784	84.08571
5	NRRI_SAFAR_JSG_KOL_SP_5	ରାମାବତ୍ର ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	7933 8377 9434	8144565008	5-12-23	21.82235	84.08331
6	NRRI_SAFAR_JSG_KOL_SP_6	ସଂଜୀବ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8406 7328 7921	7978067368	6-12-23	21.82471	84.08377
7	NRRI_SAFAR_JSG_KOL_SP_7	ଜିତ୍ୟାରୁ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	9701 2884 4540	9583670452	6-12-23	21.82507	84.07964
8	NRRI_SAFAR_JSG_KOL_SP_8	ଉପେନ୍ଦ୍ର ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4400 2537 8351	9776110950	6-12-23	21.82748	84.09013
9	NRRI_SAFAR_JSG_KOL_SP_9	ସୁରେଶ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	6182 0631 3836	8456074286	6-12-23	21.82853	84.08693
10	NRRI_SAFAR_JSG_KOL_SP_10	ପୁରୁଶୋତ୍ତମ ପଟେଲ	ସିରିଆପଲି	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4329 8528 8322	9668342077	6-12-23	21.82671	84.08706
11	NRRI_SAFAR_JSG_KOL_PM_41	ପୁରୁଶୋତ୍ତମ ଲୋଇ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4040 3281 0445	8984282286	15-12-23	21.79749	84.10366
12	NRRI_SAFAR_JSG_KOL_PM_42	ହେମନ୍ତ ଲୋଇ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8259 8245 7774	8018950948	15-12-23	21.79927	84.10406
13	NRRI_SAFAR_JSG_KOL_PM_43	ବମାଦ ପ୍ରଧାନ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	9710 5489 0650	7894298048	18-12-23	21.79698	84.10569
14	NRRI_SAFAR_JSG_KOL_PM_44	ଝରୋଜ କୁମାର ପ୍ରଧାନ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	3484 3196 4605	9556109850	18-12-23	21.79499	84.10660
15	NRRI_SAFAR_JSG_KOL_PM_45	ମଙ୍ଗଳ ଲୋଇ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213		9040973055	18-12-23	21.79117	84.10575
16	NRRI_SAFAR_JSG_KOL_PM_46	ବିରେଶ ପ୍ରଧାନ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8539 6078 6913	6370090164	18-12-23	21.79638	84.09842
17	NRRI_SAFAR_JSG_KOL_PM_47	ଅଶୋକ କୁମାର ନାଏକ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	9073 9123 1467	9861173890	19-12-23	21.79790	84.09737
18	NRRI_SAFAR_JSG_KOL_PM_48	ବୀରବ ବାସ	ପରମାନପୁର	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213			19-12-23	21.79645	84.11129
19	NRRI_SAFAR_KM_TP_71	ବିଶ୍ୱନାଥ ଗୌଡୁରା	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220		9861145386	02-01-24	21.90022	84.13176
20	NRRI_SAFAR_KM_TP_72	ଦୁଃଖ ପ୍ରଧାନ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	2776990 76668		02-01-24	21.90533	84.12411
21	NRRI_SAFAR_KM_TP_73	ବଦଲର ନାଏକ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	607123038589	7683935240	02-01-24	21.90698	84.12545
22	NRRI_SAFAR_KM_TP_74	ଜଗବନ୍ଧୁ ନାଏକ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220		7683935240	02-01-24	21.89603	84.12937
23	NRRI_SAFAR_KM_TP_75	ହେମନ୍ତ ପ୍ରଧାନ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	734901204703		02-01-24	21.89663	84.12780
24	NRRI_SAFAR_KM_TP_76	ବିଜୋଦ ସା	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	985081101131	8456827368	03-01-24	21.89690	84.12823
25	NRRI_SAFAR_KM_TP_77	ସଂଜିତ କୁମାର ସା	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	556615181971	7853916550	03-01-24	21.86582	84.12716
26	NRRI_SAFAR_KM_TP_78	ରବୀନ୍ଦ୍ର କୁମାର ବୃଦ୍ଧ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	200593048025	9337604268	03-01-24	21.89610	84.12603
27	NRRI_SAFAR_KM_TP_79	ଅମୋଦ ସା	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	977964843675	7894628940	03-01-24	21.89713	84.12679
28	NRRI_SAFAR_KM_TP_80	ପ୍ରସନ୍ନ ଲୋଇ	ଠାକୁରପଡ଼ା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768220	256114513804	8457022974	03-01-24	21.90056	84.12117
29	NRRI_SAFAR_KOL_PP_161	ଦୁଃଖ ସାହୁ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	5538 9111 5435	9337939708	1-02-24	21.81616	84.13512
30	NRRI_SAFAR_KOL_PP_162	ଲୋକନାଥ ପ୍ରଧାନ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	6584 3484 2196	9583569308	1-02-24	21.81557	84.13628
31	NRRI_SAFAR_KOL_PP_163	ପ୍ରବୀପ କୁମାର ପ୍ରଧାନ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	7041 3142 1912	7847852638	1-02-24	21.81654	84.13699
32	NRRI_SAFAR_KOL_PP_164	ଅଜିତ ସାହୁ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	5787 8347 1359	8249202105	1-02-24	21.81774	84.13669
33	NRRI_SAFAR_KOL_PP_165	ବହବନ୍ଧୁ ଲୋଇ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	2540 9171 9865	9937497166	1-02-24	21.81746	84.13468
34	NRRI_SAFAR_KOL_PP_166	ବୃଷ୍ଣ ଚନ୍ଦ୍ର ପ୍ରଧାନ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	5084 6220 0660	7008619447	1-02-24	21.81472	84.13465
35	NRRI_SAFAR_KOL_PP_167	ଇନ୍ଦ୍ରଜିତ ପ୍ରଧାନ	ପାତ୍ରପଲା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8624 7384 7072	7008852974	1-02-24	21.81444	84.13258
36	NRRI_SAFAR_KOL_181	ବିଶୋର ସମାଟ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213		7008672916	7-02-24	21.80935	84.16947
37	NRRI_SAFAR_KOL_182	ପବିତ୍ର ପଟେଲ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4128 7656 3918	9668449668	7-02-24	21.80609	84.16753
38	NRRI_SAFAR_KOL_183	ହେପ୍ତୁଙ୍କ ପଟେଲ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	3822 2516 5635		7-02-24	21.80673	84.16711
39	NRRI_SAFAR_KOL_184	ପ୍ରଶାନ୍ତ କୁମାର ପଟେଲ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	7214 1514 6994		7-02-24	21.80615	84.16852
40	NRRI_SAFAR_KOL_185	ବୈଶବ ଜେଙ୍ଗା	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	8447 3060 0186		8-02-24	21.80515	84.16941
41	NRRI_SAFAR_KOL_186	ଭବାନ୍ତ ଜେଙ୍ଗା	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	7396 5678 6869		8-02-24	21.78954	84.17968
42	NRRI_SAFAR_KOL_187	ରଘୋଷ ଚନ୍ଦ୍ର ନାଏକ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	6247 2483 5840		8-02-24	21.79102	84.13258
43	NRRI_SAFAR_KOL_188	ଚୁଲାରମ ନାଏକ	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	5948 7695 7601		9-02-24	21.80615	84.16852
44	NRRI_SAFAR_KOL_189	ଅରୁଣ ମହର	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	4529 8862 7970		9-02-24	21.80515	84.16941
45	NRRI_SAFAR_KOL_190	ବିମାଖର ମହର	ଜୋଇବିଡା	ଲୋଇଡିଗା	ଝାରସୁଗୁଡ଼ା	768213	3603 3223 1236		9-02-24	21.79102	84.13258
46	NRRI_SAFAR_KM_NP_141	ସୁଶିଳ ପଟେଲ	ଜମ୍ପାପଲା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768221	8413022241 30	9937426259	23-01-24	21.90075	84.16510
47	NRRI_SAFAR_KM_NP_142	ମଗୋର ରାଣା	ଜମ୍ପାପଲା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768221	809861224397	8144839099	23-01-24	21.90429	84.16302
48	NRRI_SAFAR_KM_NP_143	ଖଡୁ ରାଣା	ଜମ୍ପାପଲା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768221	273853126376	9337876494	23-01-24	21.90377	84.16321
49	NRRI_SAFAR_KM_NP_144	ଉଲଛର ରାଣା	ଜମ୍ପାପଲା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768221	6866654692 56	96268410	23-01-24	21.90198	84.16452
50	NRRI_SAFAR_KM_NP_145	ସଂଜୀବ ସେଠୀ	ଜମ୍ପାପଲା	ବିରମିଗା	ଝାରସୁଗୁଡ଼ା	768221	870992352467	9777416016	23-01-24	21.89888	84.16987

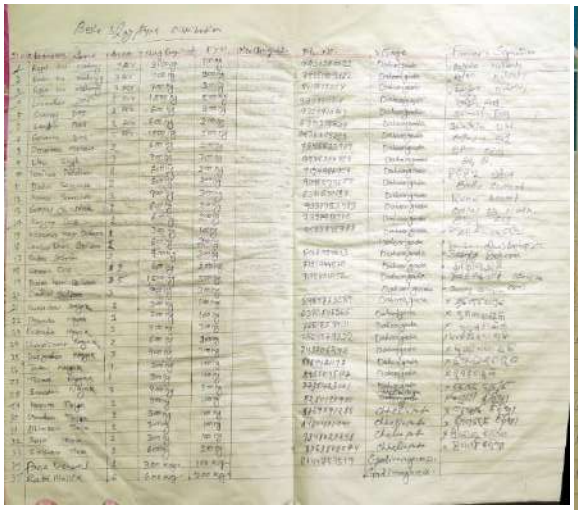
2	5-1-24	ବସନ୍ତକୁଷ୍ଠ ପ୍ରଧାନ	NRRI_SAFAR_CTC_CM 2	20.622453	86.185188	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
3	5-1-24	ରମେଶ ପଟାଲ	NRRI_SAFAR_CTC_CM 3	20.620018	86.177277	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
4	5-1-24	ରାମ ଚନ୍ଦ୍ର ସାମଲ	NRRI_SAFAR_CTC_CM 4	20.620038	86.193769	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
5	5-1-24	ବିଜୟ କୁମାର ସେଠୀ	NRRI_SAFAR_CTC_CM 5	20.617655	86.176335	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
6	5-1-24	ଗଗଜ ଦାସ	NRRI_SAFAR_CTC_CM 6	20.619189	86.177196	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
7	5-1-24	ଥୈଲଙ୍ଗା ଲୋଇ	NRRI_SAFAR_CTC_CM 7	20.619195	86.177201	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
8	5-1-24	ବଜ୍ରତନୁ ରାଉତ	NRRI_SAFAR_CTC_CM 8	20.619198	86.177202	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
9	5-1-24	ଶିରାଡ ଚନ୍ଦ୍ର ବଳବନ୍ତରାୟ	NRRI_SAFAR_CTC_CM 9	20.619686	86.177144	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
10	8-1-24	ବିଜୟ କୁମାର ବଳବନ୍ତରାୟ	NRRI_SAFAR_CTC_CM 10	20.551988	86.213792	ମୂଳବସନ୍ତ	ମାହାଙ୍ଗା	ଜଟକ	754206	NIL	NIL
11	8-1-24	ଗୋପାଳ ଚରଣ ସାହୁ	NRRI_SAFAR_CTC_CM 11	20.5523	86.259506	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	7968 4189 9490	8658021016
12	8-1-24	ଧୀରେନ୍ଦ୍ର କୁମାର ସାହୁ	NRRI_SAFAR_CTC_CM 12	20.558362	86.21315	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	9268 5709 0125	7894604102
13	8-1-24	ସୁଶିଲ କୁମାର ସାହୁ	NRRI_SAFAR_CTC_CM 13	20.55148	86.212956	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	8283 0305 2562	7749871968
14	8-1-24	ଉତ୍ତାବାଜ ମଙ୍ଗଳାଜ	NRRI_SAFAR_CTC_CM 14	20.553599	86.212952	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	9794 6271 3553	9938243787
15	8-1-24	ଧନେଶ୍ୱର ସ୍ୱାଇଁ	NRRI_SAFAR_CTC_CM 15	20.553305	86.21243	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	2763 7385 0535	9439034789
16	8-1-24	ଧନେଶ୍ୱର ସ୍ୱାଇଁ	NRRI_SAFAR_CTC_CM 16	20.551579	86.226687	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	2763 7385 0535	9439034789
17	8-1-24	ଖଗେଶ୍ୱର ସାହୁ	NRRI_SAFAR_CTC_CM 17	20.551587	86.226669	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	9275 2889 3416	7205144375
18	8-1-24	ବିପ୍ରିରଞ୍ଜନ ସାହୁ	NRRI_SAFAR_CTC_CM 18	20.551278	86.226423	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	3407 9445 9954	7684890998
19	8-1-24	ରାମ ସାହୁ	NRRI_SAFAR_CTC_CM 19	20.551274	86.226407	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	3493 7842 9899	7735487151
20	8-10-24	ଶିବ ପ୍ରସାଦ ସାହୁ	NRRI_SAFAR_CTC_CM 20	20.554011	86.235181	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	7415 5890 7929	8018947328
21	8-10-24	ଶିବ ପ୍ରସାଦ ସାହୁ	NRRI_SAFAR_CTC_CM 21	20.554011	86.235181	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	7415 5890 7929	8078943728
22	8-10-24	ଅଜନ୍ତ ନରଣ ସାହୁ	NRRI_SAFAR_CTC_CM 22	NIL	NIL	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	3851 1643 5109	8457905561
23	8-10-24	ଖେତୁବାସୀ ଢେଙ୍ଗା	NRRI_SAFAR_CTC_CM 23	NIL	NIL	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	4410 4039 7750	9900202589
24	8-10-24	ଗଣେଶ୍ୱର ମଲ୍ଲିକ	NRRI_SAFAR_CTC_CM 24	NIL	NIL	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	2555 2947 5110	9938360202
25	8-10-24	ପ୍ରଭାତ କୁମାର ଜାଷ୍ଟର	NRRI_SAFAR_CTC_CM 25	NIL	NIL	ଗୋକଳ	ମାହାଙ୍ଗା	ଜଟକ	754206	3699 0938 2129	9777910953

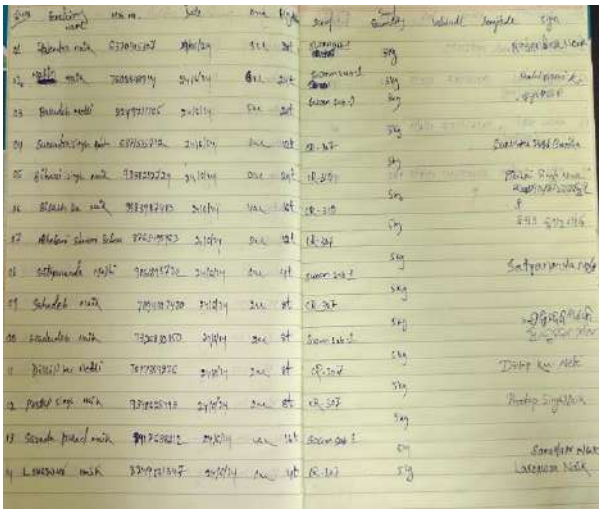
SL No.	Sample No	Farmer's Name	Samples collection date	Village	Block	District	PIN Code	Adhaar no	Mobile No	Latitude	Longitude
1	NRRI_SAFAR_ANGUL-02	ସୁଦୀପ କୁମାର ସାହୁ	14-01-24	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	9556090894	21.112428	84.740483
2	NRRI_SAFAR_ANGUL-04	ସୌଦିହି ସାହୁ	17-01-26	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	NIL	21.114722	84.744309
3	NRRI_SAFAR_ANGUL-12	ଅଭୟ ସାହୁ	16-01-30	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	NIL	21.114401	84.731652
4	NRRI_SAFAR_ANGUL-13	ଟୈତାରି ସାହୁ	14-01-24	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7077771158	21.114386	84.731971
5	NRRI_SAFAR_ANGUL-16	ରଲି ସାହୁ	17-01-24	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7894214177	21.111593	84.883989
6	NRRI_SAFAR_ANGUL-21	ଲଖିନ ସାହୁ	14-01-24	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7325874575	21.106286	84.733709
7	NRRI_SAFAR_ANGUL-22	ଲୁଚମଣି ସାହୁ	16-01-29	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7894752899	21.116286	84.73415
8	NRRI_SAFAR_ANGUL-23	ସୁଭିଦା ସାହୁ	17-01-28	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7751887599	21.112442	84.740482
9	NRRI_SAFAR_ANGUL-26	ଲୁଚମଣି ସାହୁ	17-01-30	ତୁଆଁପା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7894752899	21.116286	84.73415
10	NRRI_SAFAR_ANGUL-28	ଅରୁଣ ସେନାପତି	16-01-26	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	8114801250	21.088687	84.848758
11	NRRI_SAFAR_ANGUL-33	ବିବିତ୍ରା ଦେହୁରୀ	13-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	8144489599	21.14824	84.94843
12	NRRI_SAFAR_ANGUL-35	ଅଭୟ ସାହୁ	13-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	8456941595	21.14824	84.94843
13	NRRI_SAFAR_ANGUL-36	ଜମିନା ସାହୁ	16-01-28	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9178737287	21.43242	84.948426
14	NRRI_SAFAR_ANGUL-37	ବିଜୟ ଭୁଜିଆ	13-01-24	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759129	NIL	9078298116	21.09632	84.90743
15	NRRI_SAFAR_ANGUL-38	ପୁଷ୍ପଲତା ସାହୁ	13-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	7894616580	21.13449	84.9416
16	NRRI_SAFAR_ANGUL-39	ପିତାମ୍ବର ଖଲାରି	17-01-25	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	8985112223	21.111222	84.883989
17	NRRI_SAFAR_ANGUL-41	ସ୍ୱପ୍ନେଶ୍ୱର ଖଲାରି	16-01-31	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7751023347	21.143658	84.925003
18	NRRI_SAFAR_ANGUL-42	ଅର୍ଜୁନ ଖଲାରି	13-01-24	ଗୋବିନ୍ଦପଶି	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759129	NIL	6372701075	21.09984	84.91329
19	NRRI_SAFAR_ANGUL-47	ଗଗେଶ୍ୱର ଖୁଲାର	13-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9556064294	21.136	84.94225
20	NRRI_SAFAR_ANGUL-52	ଚାତିବନ୍ଧୁ ଖଲାର	16-01-27	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	8456809461	21.111593	84.883989
21	NRRI_SAFAR_ANGUL-55	ସଂଯୁକ୍ତା ଖୋଇ	16-01-25	ଗୋବିନ୍ଦପଶି ଜଙ୍ଗଲ	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759141	NIL	7608974522	21.096938	84.890827
22	NRRI_SAFAR_ANGUL-57	ସୁଦାମ ଦେହୁରୀ	13.01.24	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9938858436	21.14593	84.93212
23	NRRI_SAFAR_ANGUL-58	ଝୁମା ଦେହୁରୀ	17-01-27	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	7750938899	21.149906	84.922725
24	NRRI_SAFAR_ANGUL-62	ଘନଶ୍ୟାମ ଦେହୁରୀ	13-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	7894645209	21.13449	84.9416
25	NRRI_SAFAR_ANGUL-64	ଦୋଳଗୋବିନ୍ଦ ସାହୁ	16-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	7894852222	21.143242	84.948426
26	NRRI_SAFAR_ANGUL-65	ଜିତେନ୍ଦ୍ର ସାହୁ	13.01.24	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9556194484	21.14573	84.93216
27	NRRI_SAFAR_ANGUL-66	ଅଜନ୍ତ ଦେହୁରୀ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	864176761242 NIL		21.14824	84.94843
28	NRRI_SAFAR_ANGUL-67	ପାଞ୍ଚୁ ପ୍ରଧାନ	13.01.24	ବଜାରସାହି,କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759122	436345754011 NIL		21.14824	84.94843
29	NRRI_SAFAR_ANGUL-68	ଗଙ୍ଗା ବେହେରା	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	644742148005 NIL		21.09632	84.90743
30	NRRI_SAFAR_ANGUL-69	ଅଜାଦି ବିଶ୍ୱାଳ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	937061904910 NIL		21.13449	84.9416
31	NRRI_SAFAR_ANGUL-70	ଧରଣୀ ସାହୁ	13.01.24	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9938355617	21.14607	84.93119
32	NRRI_SAFAR_ANGUL-71	ସୁରେଶ ଚନ୍ଦ୍ର ତ୍ରିପାଠୀ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	629131381924 NIL		21.09984	84.91329
33	NRRI_SAFAR_ANGUL-72	ବାବୁଲି ସାହୁ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	656484841387 NIL		21.136	84.94225
34	NRRI_SAFAR_ANGUL-73	ବିଶ୍ୱଜୀତ ନାୟକ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	978288073291 NIL		21.14593	84.93212
35	NRRI_SAFAR_ANGUL-74	ସପନ ନାୟକ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	894231948238 NIL		21.13449	84.9416
36	NRRI_SAFAR_ANGUL-75	ଦମୟାର ଦେହୁରୀ	13.01.24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	820782045830 NIL		21.14573	84.93216
37	NRRI_SAFAR_ANGUL-76	ବିଜୟ ନାୟକ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	317322657757 NIL		21.14607	84.93119
38	NRRI_SAFAR_ANGUL-77	ଧରଣୀ ସାହୁ	13.01.24	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	9938355617	21.14607	84.93119
39	NRRI_SAFAR_ANGUL-78	ମୋହନ ପ୍ରଧାନ	17-01-29	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	515508067794 NIL		21.13449	84.9416
40	NRRI_SAFAR_ANGUL-79	ପ୍ରଶାନ୍ତ ତ୍ରିପାଠୀ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	794728862570 NIL		21.14607	84.93119
41	NRRI_SAFAR_ANGUL-80	ପିତବାସ ନାୟକ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	277760713056 NIL		21.14578	84.93379
42	NRRI_SAFAR_ANGUL-81	ତୁଲା ତ୍ରିପାଠୀ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	380486653546 NIL		21.136	84.94225
43	NRRI_SAFAR_ANGUL-82	ପବିତ୍ର ଦେହୁରୀ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	634182481213 NIL		21.14593	84.93212
44	NRRI_SAFAR_ANGUL-83	ଅଭୟ ଦେହୁରୀ	13.01.24	ଆଖାରିକଟା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	8455808746	21.14578	84.93379
45	NRRI_SAFAR_ANGUL-84	କସନ୍ତ ନାୟକ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	464098989134 NIL		21.13449	84.9416
46	NRRI_SAFAR_ANGUL-85	ଚଞ୍ଚଳ ଦେହୁରୀ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	962864805576 NIL		21.14573	84.93216
47	NRRI_SAFAR_ANGUL-86	ସୈରୁଷ୍ମ ନାୟକ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	282765502597 NIL		21.14607	84.93119
48	NRRI_SAFAR_ANGUL-87	ବପତ୍ତ ସାହୁ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	986334829613 NIL		21.14607	84.93119
49	NRRI_SAFAR_ANGUL-88	ପ୍ରମୋଦ ନାୟକ	14-01-24	କମ୍ପସଲା	ଛେଣ୍ଡିପଦା	ଅନୁଗୋଳ	759130	NIL	NIL	21.14578	84.93379

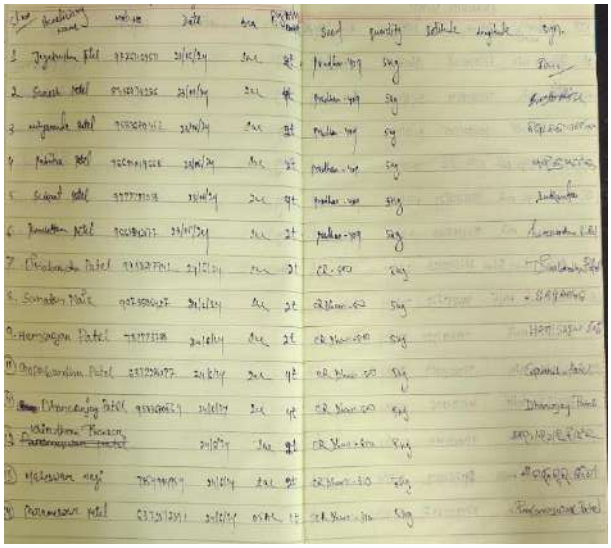
1	17-01-2024	ଗାପଚ ମଲାଣି	NRRI_SAFAR_CTC_CS 1	20.664446	85.938599	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8708 2256 3461	9439 2360 3
2	17-01-2024	ଅରିଞ୍ଜେଇ ରାଉତ	NRRI_SAFAR_CTC_CS 2	20.663134	85.935966	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	4774 0918 7716	9938 1218 64
3	17-01-2024	ବିମଲାଞ୍ଜା ରାଉତ	NRRI_SAFAR_CTC_CS 3	20.661343	85.936107	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	6086 7256 1001	NIL
4	17-01-2024	ରାମ ଚନ୍ଦ୍ର ରାଉତ	NRRI_SAFAR_CTC_CS 4	20.661516	85.936169	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	7394 5846 8282	NIL
5	17-01-2024	ବସନ୍ତ କୁମାର ରାଉତ	NRRI_SAFAR_CTC_CS 5	20.661381	85.936109	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	3051 2525 3688	9438 3385 01
6	17-01-2024	ପ୍ରିୟବ୍ରତ ରାଉତ	NRRI_SAFAR_CTC_CS 6	20.661148	85.936034	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	4441 0185 4323	9861 7352 44
7	17-01-2024	ପବିତ୍ର ବୁଦ୍ଧି	NRRI_SAFAR_CTC_CS 7	20.662067	85.938484	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8800 0173 8028	8763 4513 19
8	17-01-2024	ବିଜୟଜିତ ଦେହୋରା	NRRI_SAFAR_CTC_CS 8	20.664446	85.938599	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	6110 0815 5651	9938 2114 77
9	19-01-2024	ଶିବ ନାରାୟଣ ସାହୁ	NRRI_SAFAR_CTC_CS 9	20.661504	85.939572	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2536 4510 5105	NIL
10	19-01-2024	ଧରୁବ ଚରଣ ସାହୁ	NRRI_SAFAR_CTC_CS 10	20.661322	85.939221	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	5065 3513 7607	NIL
11	19-01-2024	ଭରମା ଚରଣ ସାହୁ	NRRI_SAFAR_CTC_CS 11	20.66093	85.939069	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2165 5377 0193	NIL
12	19-01-2024	ସାଗର ସାହୁ	NRRI_SAFAR_CTC_CS 12	20.661317	85.939135	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	5220 7272 1570	NIL
13	19-01-2024	ରାଜେଶ କୁମାର ସାହୁ	NRRI_SAFAR_CTC_CS 13	20.667056	85.938918	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2717 0318 9794	9776 0554 97
14	19-01-2024	ପ୍ରଭାତ ଖଟୋ	NRRI_SAFAR_CTC_CS 14	20.663078	85.93784	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2728 3610 8561	7894 2616 03
15	19-01-2024	ବିକାଶ କୁମାର ସାହୁ	NRRI_SAFAR_CTC_CS 15	20.663177	85.937594	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	6834 5610 0607	9178 6057 04
16	20-01-2024	ସତ୍ରୁଘ୍ନ କୁମାର ଧନ	NRRI_SAFAR_CTC_CS 16	20.663579	85.936978	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2512 8268 4664	9853 8482 98
17	20-01-2024	ସୌମେନ୍ଦ୍ର କୁମାର ଧନ	NRRI_SAFAR_CTC_CS 17	20.663819	85.936882	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	9757 3849 8157	NIL
18	20-01-2024	ଶୁଭେନ୍ଦୁ କୁମାର ଧନ	NRRI_SAFAR_CTC_CS 18	20.663852	85.93681	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8874 5368 6471	9937 6313 99
19	20-01-2024	ଭାସ୍କର କୁମାର ଧନ	NRRI_SAFAR_CTC_CS 19	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2458 6911 4383	9348 2944 60
20	20-01-2024	ଛେତ୍ରବାସୀ ନାୟକ	NRRI_SAFAR_CTC_CS 20	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8760 8240 0447	9556 1054 46
21	20-01-2024	ଅଜିତ ଦେହୋରା	NRRI_SAFAR_CTC_CS 21	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	9706 7014 3988	NIL
22	20-01-2024	ଠାକୋରନ୍ଦୁ ଦେହୋରା	NRRI_SAFAR_CTC_CS 22	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8996 4108 6726	9556 2742 55
23	20-01-2024	ବିଜୁଥମା ସାହୁ	NRRI_SAFAR_CTC_CS 23	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	8251 2661 8864	NIL
24	20-01-2024	ବିରଞ୍ଚିନ ମହାନ୍ତ	NRRI_SAFAR_CTC_CS 24	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	2020 8392 9692	NIL
25	20-01-2024	ବେଳବ ଚରଣ ନାୟକ	NRRI_SAFAR_CTC_CS 25	NIL	NIL	ଓଡି	ଟାଙ୍ଗୀ	752023	ଜଗତ	6832 8949 1643	NIL

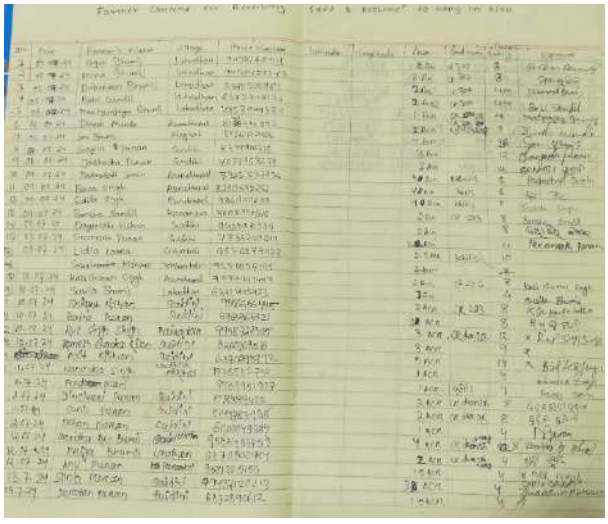
Annexure -4

List of selected fields for Application of EcoLime+



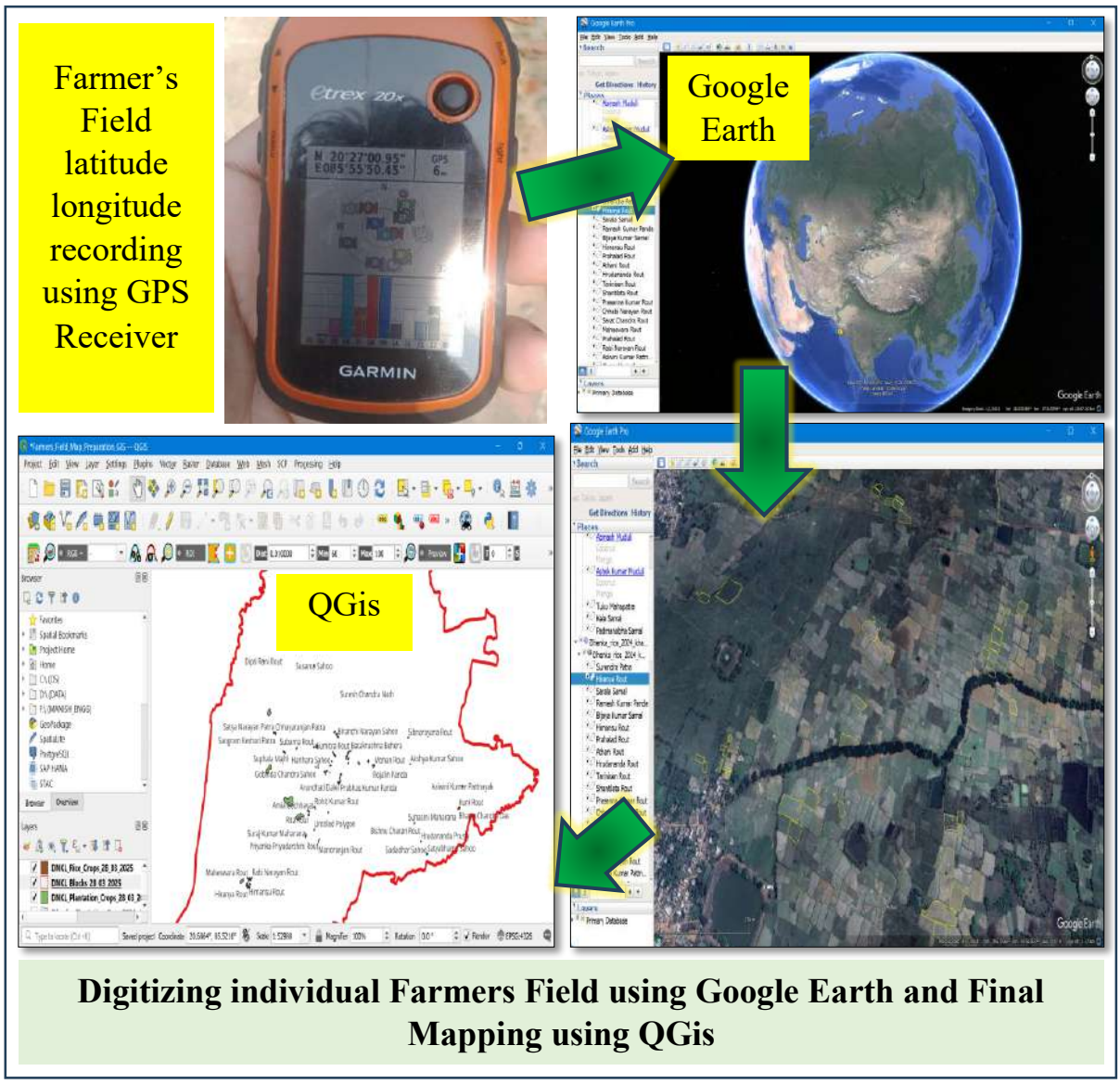






Annexure -5.1

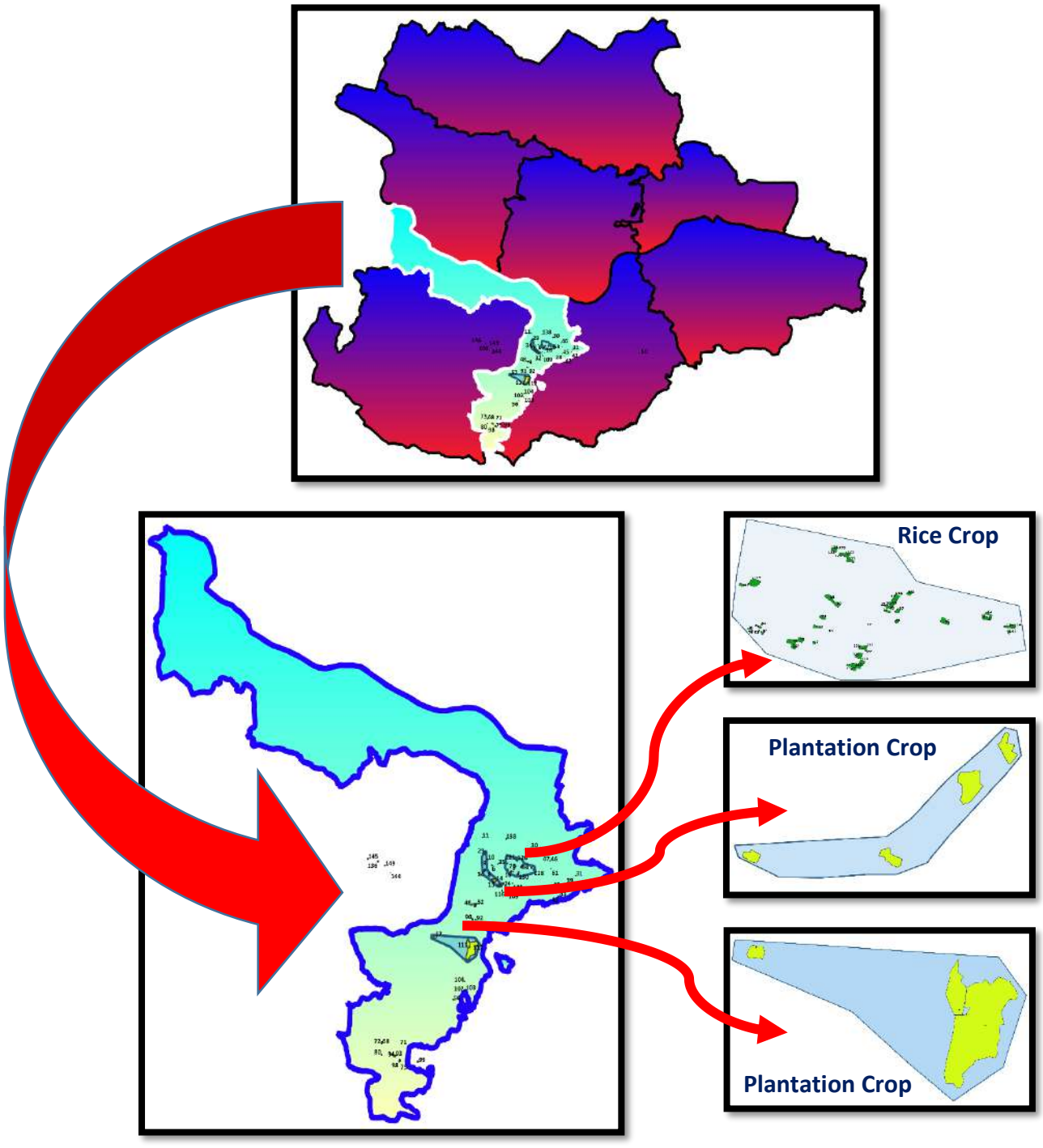
Digitization of individual Farmers Field using Google Earth and Final Mapping using QGis



Digitizing individual Farmers Field using Google Earth and Final Mapping using QGis

Annexure -5.2(a)

Digitization of 150 farmer's field (Rice and Plantation crops) of Hindol and Odapada Blocks of Dhenkanal district covered under EcoLime+ application during Kharif, 2024.



Annexure -5.2(b)

Details of 150 farmer's field (Rice and Plantation crops) of Hindol and Odapada Blocks of Dhenkanal district, Odisha covered under EcoLime+ application during Kharif 2024.

Sl.No	Farmers Name	Village	Mobile no.	Latitude	Longitude
1	Natabara Nayak	Daharigada	7681859031	20.70297	85.975956
2	Laxmidhar Das	Daharigada	9337811717	20.70345	85.975958
3	Dhaneswar Naik	Daharigada	7504579322	20.70369	85.975744
4	Dhurba Naik	Daharigada	9556900902	20.70398	85.975331
5	Golakha Das	Daharigada	9938309209	20.70353	85.976528
6	Tapi Naik	Daharigada	8249102018	20.70451	85.975614
7	Tulasi Nayak	Daharigada	8455045117	20.70468	85.975756
8	Kunta Nayak	Daharigada	8455044247	20.70289	85.977964
9	Bishnu Nayak	Daharigada	9040273142	20.70311	85.977464
10	Duryodhana Nayak	Daharigada	7437062441	20.70336	85.97545
11	Kamini Nayak	Daharigada	8984773589	20.70356	85.977089
12	Chaitanya Sahoo	Kharamangi	6372857984	20.72467	86.047381
13	Sibaram Sahoo	Kharamangi	7846876323	20.72155	86.050994
14	Sumita Sahoo	Kharamangi	9348400432	20.72132	86.051103
15	Bikuna Baniya	Kharamangi	6369818767	20.72148	86.052153
16	Surash Sahoo	Kharamangi	9776201992	20.72149	86.051311
17	Raghunath Tripathi	Kharamangi	9937628481	20.73897	86.052575
18	Bilasha Nayak	Kharamangi	9437650147	20.7223	86.052519
19	Purastama Sahoo	Kharamangi	6370010335	20.72207	86.052786
20	Nira Barik	Kharamangi	9937323312	20.72217	86.053117
21	Hadibandhu Sahoo	Kharamangi	9861729958	20.72233	86.053064
22	Suriya Sahoo	Kharamangi	7873666378	20.7224	86.052944
23	Saraswati Singh	Gadimagura	9861853372	20.7251	86.047658
24	Trilochan Singh	Gadimagura	9861853372	20.7255	86.047519
25	Ramchandra Singh	Gadimagura	N/A	20.72596	86.047536
26	Prana Krushna Dehuri	Gadimagura	9040276713	20.72902	86.034886
27	Ganeswar Dehuri	Gadimagura	9853178850	20.729	86.034342
28	Dharani Dehuri	Gadimagura	9348749912	20.72915	86.033825
29	Promod Dehuri	Gadimagura	9178705028	20.73049	86.033511
30	Subala Behera	Dehugada	8018024643	20.7044	85.975139
31	Duttahari Behera	Dehugada	7077989305	20.70198	85.976878
32	Ranjan Mohanty	Dehugada	8117815254	20.7024	85.977975
33	Dambrudhar Behera	Dehugada	9348533217	20.70876	85.97515
34	Prabir Das	Dehugada	7751944570	20.70584	85.974828
35	Sisira Das	Dehugada	7751944570	20.70567	85.975011
36	Nabina Samal	Dehugada	8984421196	20.70223	85.977922
37	Karunakar Behera	Dehugada	9583845968	20.70242	85.977325

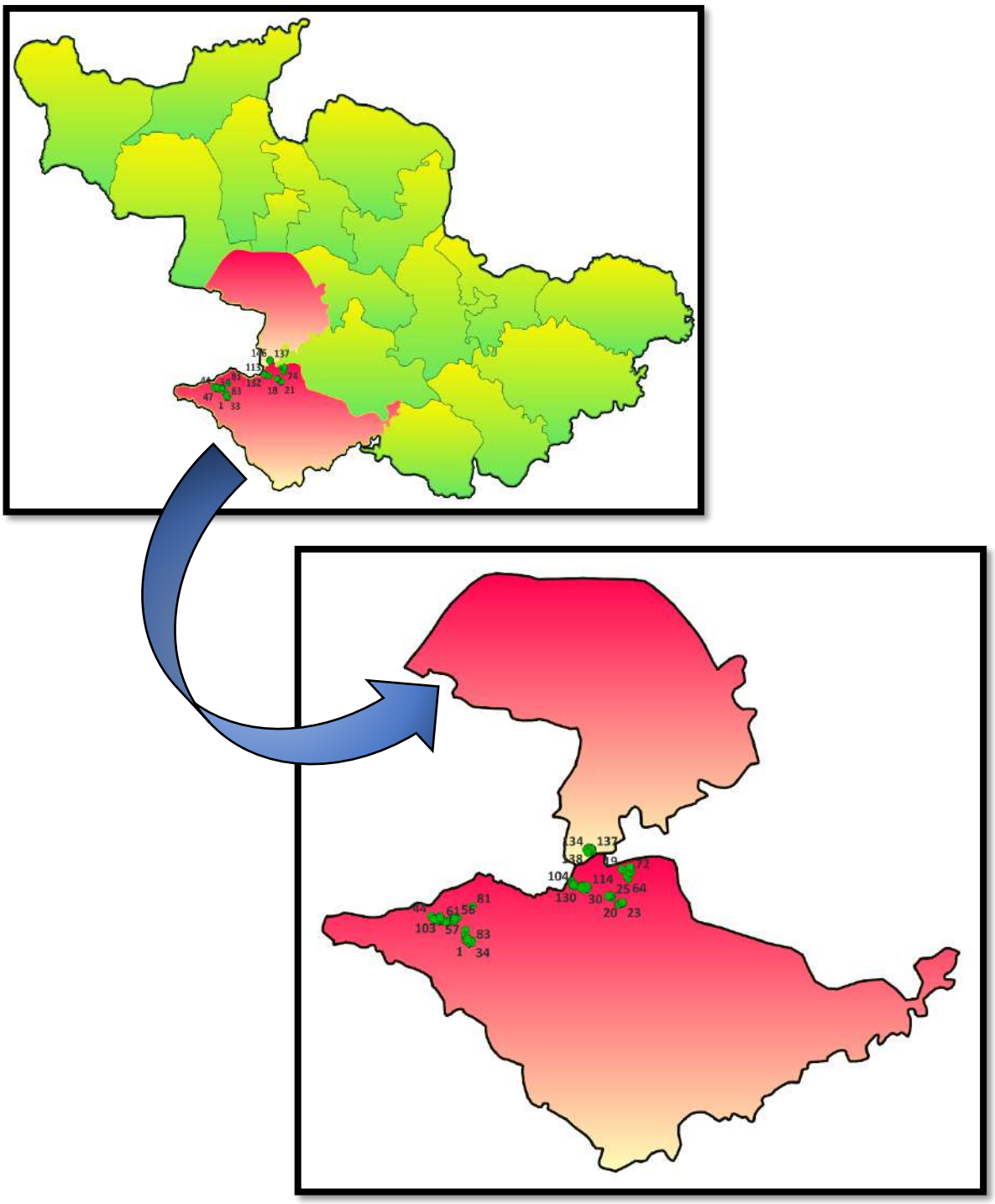
38	Biswajit Patra	Balarampur	20.6741944	85.495714
39	Chaturbhuja Rout	Bidabandha	20.6621889	85.550217
40	Kuni Rout	Bidabandha	20.6623056	85.550525
41	Bharat Chandra Das	Bidabandha	20.6621694	85.550497
42	Gadadhar Sahoo	Korehigudia	20.6533806	85.539722
43	Satyabhama Sahoo	Korehigudia	20.6533556	85.539875
44	Hrudananda Prusty	Korehigudia	20.6558083	85.537511
45	Suhasini Maharana	Khuntajhiri	20.659425	85.535411
46	Sibnarayana Rout	Chhatia	20.6763139	85.533583
47	Puspalata Rout	Chhatia	20.6763417	85.533258
48	Sudhansu Sekhar Rout	Kandbindha	20.6478806	85.477242
49	Sarat Chandra Rout	Kandabindha	20.6481306	85.480478
50	Prakash Kumar Rout	Kandabindha	20.6604278	85.663392
51	Tarinisen Rout	Kandabindha	20.6474056	85.479325
52	Rabi Narayan Rout	Kandabindha	20.6484083	85.480853
53	Maheswara Rout	Kandabindha	20.6484361	85.479569
54	Chhabi Narayan Rout	Kandabindha	20.6480028	85.479703
55	Prasanna Kumar Rout	Kandabindha	20.6478167	85.479672
56	Tapan Kumar Jenamani	Gobind Prasad	20.5857667	85.46395
57	Tuku Mahapatra	Gobind Prasad	20.6272111	85.450989
58	Pramod Kumar Sahoo	Kandabindha	20.6727833	85.512772
59	Pratima Sahoo	Kandabindha	20.6730417	85.512875
60	Ashish Kumar Sahoo	Kandabindha	20.6733694	85.513122
61	Akshya Kumar Sahoo	Kandabindha	20.671	85.5342
62	Bigyan Pradhan	Dengaborei	20.6716306	85.519847
63	Dharmananda Rout	Dengaborei	20.6716917	85.520153
64	Duhsasana Rout	Dengaborei	20.6719583	85.519992
65	Sudhakara Pradhan	Dengaborei	20.6717639	85.520172
66	Bansidhara Dehuri	Kandabindha	20.6695417	85.505472
67	Harihara Sahoo	Kandabindha	20.6707167	85.507417
68	Pritik kumar Panda	Dinabandhupur	20.5573528	85.413033
69	Soubhagya Ranjan Panda	Dinabandhupur	20.5575139	85.412881
70	Bijaya Kumar Samal	Dinabandhupur	20.5461722	85.425544
71	Bhagirathi Sahoo	Dinabandhupur	20.5568639	85.425744
72	Pamdita Panda	Dinabandhupur	20.5574778	85.412631
73	Surendra Patra	Dinabandhupur	20.5582222	85.412547
74	Somya Ranjan Panda	Dinabandhupur	20.5579556	81.413053
75	Ramesh Kumar Panda	Dinabandhupur	20.5442556	85.425869

76	Gopabandhu Samal	Dinabandhupur	20.5453167	85.425547
77	Adwaita Samal	Dinabandhupur	20.5467944	85.425528
78	Basanta Dehury	Kandabindha	20.6715944	85.507614
79	Gobinda Chandra Sahoo	Kandabindha	20.6704917	85.502475
80	Kailash Chandra Panda	Dinabandhupur	20.5502472	85.412869
81	Satya Prakash Sahoo	Kandabindha	20.67065	85.502153
82	Rajkishore Sahoo	Kandabindha	20.6707222	85.503086
83	Pranabandha Sahoo	Kandabindha	20.6703028	85.5031
84	Padan Kumar Sahoo	Kandabindha	20.6705028	85.502922
85	Kartikeswara Sahoo	Kandabindha	20.6723028	85.513389
86	Papuna Sahoo	Kandabindha	20.6708111	85.502942
87	Adaita Sahoo	Kandabindha	20.6703972	85.503175
88	Laxman Kumar Sahoo	Kandabindha	20.6709972	85.503133
89	Sudhakar Rout	Kandabindha	20.656175	85.503644
90	Chhabindra Kumar Sahoo	Kandabindha	20.638575	85.477678
91	Dillip Kumar Sahoo	Kandabindha	20.637975	85.477958
92	Dhaneswara Nayak	Tamanda	20.6378306	85.480133
93	Padmanabha Samal	Dinabandhupur	20.5493417	85.422444
94	Kela Samal	Dinabandhupur	20.5489806	85.422397
95	Sanatana Samal	Dinabandhupur	20.5457778	85.425636
96	Deepak Samal	Dinabandhupur	20.545775	85.425908
97	Hansadhwaj Samal	Dinabandhupur	20.5455389	85.42555
98	Hemanta Samal	Dinabandhupur	20.5454917	85.425222
99	Sarala Samal	Dinabandhupur	20.545425	85.439183
100	Jayanta Kumar Samal	Dinabandhupur	20.5457	85.425136
101	Sarat Chandra Majhi	Dinabandhupur	20.5458361	85.425275
102	Baruna Kumar Rout	Ichhapur	20.5916306	85.4721
103	Roji Rout	Ichhapur	20.5922889	85.472739
104	Manas Kumar Sahoo	Ichhapur	20.5977583	85.472214
105	Sulochana Rout	Kandabindha	20.6613778	85.506481
106	Rita Rout	Kandabindha	20.6610444	85.499889
107	Prahalad Sahoo	Kandabindha	20.6690667	85.505433
108	Manoranjan Rout	Kandabindha	20.6554167	85.503331
109	Dipti Ranjan Rout	Kandabindha	20.6556056	85.503339
110	Priyanka Priyadarshini Rout	Kandabindha	20.6558444	85.503194
111	Abinash Muduli	Tamanda	20.620275	85.474794
112	Ashok Kumar Muduli	Tamanda	20.61855	85.477883
113	Hiranya Rout	Kandabindha	20.6466639	85.479361

114	Himansu Rout	Kandabindha	20.6468139	85.479786
115	Suraj Kumar Maharana	Kandabindha	20.6575194	85.498714
116	Biswanath Dalei	Kandabindha	20.6569389	85.498967
117	Akhila Dalei	Kandabindha	20.6671722	85.509975
118	Maheswara Rout	Dengaborei	20.6708667	85.521411
119	Mohan Rout	Dengaborei	20.6708778	85.521969
120	Rojalin Panda	Dengaborei	20.6703361	85.521583
121	Kalandi Charan Prusty	Sariapada	20.6775861	85.508811
122	Bikram Kumar Prusty	Sariapada	20.6773611	85.508597
123	Nilamani Prusty	Sariapada	20.6774861	85.508881
124	Ashok Kumar Pradhan	Sariapada	20.6770861	85.509106
125	Ramesh Chandra Pradhan	Sariapada	20.6769722	85.509447
126	Parsuram Pradhan	Sariapada	20.67715	85.509536
127	Pratap Kumar Parida	Kandabindha	20.6688667	85.510853
128	Prabhas Kumar Parida	Kandabindha	20.6679583	85.510569
129	Arundhati Dalei	Kandabindha	20.6674944	85.510106
130	Atitha Parida	Kandabindha	20.6683917	85.510461
131	Amulya Sahoo	Kandabindha	20.6690889	85.510492
132	Sagar Chandra Parida	Kandabindha	20.6691667	85.510967
133	Soubhagya Rout	Kandabindha	20.6560806	85.503536
134	Manoj Kumar Samal	Bampa	20.6758806	85.410258
135	Abani Samal	Bampa	20.6760111	85.410703
136	Sukadev Samal	Bampa	20.675625	85.410306
137	Biranchi Narayan Sahoo	Sariapada	20.6765722	85.509631
138	Susama Sahoo	Balarampur	20.6908583	85.501558
139	Gyanendra Rout	Kandabindha	20.6749417	85.502533
140	Shantilata Rout	Kandabindha	20.6621611	85.5023
141	Subarna Rout	Balarampur	20.674325	85.501656
142	Sumitra Rout	Kandabindha	20.6736222	85.513625
143	Batakrushna Behera	Kandabindha	20.6736944	85.514058
144	Prasanta Behera	Bampa	20.6686806	85.419092
145	Apati Samal	Bampa	20.6780028	85.4029
146	Ashok Kumar Majhi	Bampa	20.6777222	85.402894
147	Basanti Samal	Bampa	20.677725	85.402889
148	Hrusikesh Samal	Bampa	20.6775167	85.402878
149	Sanjukta Samal	Bampa	20.6733194	85.415083
150	Satya Narayan Samal	Bampa	20.6733083	85.414825

Annexure -5.3(a)

Digitization of 150 farmers field (Rice and Plantation crops) of Badachana and Dharmasala Blocks of Jajpur district, Odisha covered under EcoLime+ application during Kharif 2024.



Annexure -5.3(b)

Details of 150 farmer's field (Rice and Plantation crops) of Badachana and Dharmasala Blocks of Jajpur district, Odisha covered under EcoLime+ application during Kharif 2024

Sl.No	Farmers Name	Village	Mobile no.	lat.	long.
1	Natabara Nayak	Daharigada	7681859031	20.70297	85.97596
2	Laxmidhar Das	Daharigada	9337811717	20.70345	85.97596
3	Dhaneswar Naik	Daharigada	7504579322	20.70369	85.97574
4	Dhurba Naik	Daharigada	9556900902	20.70398	85.97533
5	Golakha Das	Daharigada	9938309209	20.70353	85.97653
6	Tapi Naik	Daharigada	8249102018	20.70451	85.97561
7	Tulasi Nayak	Daharigada	8455045117	20.70468	85.97576
8	Kunta Nayak	Daharigada	8455044247	20.70289	85.97796
9	Bishnu Nayak	Daharigada	9040273142	20.70311	85.97746
10	Duryodhana Nayak	Daharigada	7437062441	20.70336	85.97545
11	Kamini Nayak	Daharigada	8984773589	20.70356	85.97709
12	Chaitanya Sahoo	Kharamangi	6372857984	20.72467	86.04738
13	Sibaram Sahoo	Kharamangi	7846876323	20.72155	86.05099
14	Sumita Sahoo	Kharamangi	9348400432	20.72132	86.0511
15	Bikuna Baniya	Kharamangi	6369818767	20.72148	86.05215
16	Surash Sahoo	Kharamangi	9776201992	20.72149	86.05131
17	Raghunath Tripathi	Kharamangi	9937628481	20.73897	86.05258
18	Bilasha Nayak	Kharamangi	9437650147	20.7223	86.05252
19	Purastama Sahoo	Kharamangi	6370010335	20.72207	86.05279
20	Nira Barik	Kharamangi	9937323312	20.72217	86.05312
21	Hadibandhu Sahoo	Kharamangi	9861729958	20.72233	86.05306
22	Suriya Sahoo	Kharamangi	7873666378	20.7224	86.05294
23	Saraswati Singh	Gadimagura	9861853372	20.7251	86.04766
24	Trilochan Singh	Gadimagura	9861853372	20.7255	86.04752
25	Ramchandra Singh	Gadimagura	N/A	20.72596	86.04754
26	Prana Krushna Dehuri	Gadimagura	9040276713	20.72902	86.03489
27	Ganeswar Dehuri	Gadimagura	9853178850	20.729	86.03434
28	Dharani Dehuri	Gadimagura	9348749912	20.72915	86.03383
29	Promod Dehuri	Gadimagura	9178705028	20.73049	86.03351
30	Subala Behera	Dehugada	8018024643	20.7044	85.97514
31	Duttahari Behera	Dehugada	7077989305	20.70198	85.97688
32	Ranjan Mohanty	Dehugada	8117815254	20.7024	85.97798
33	Dambrudhar Behera	Dehugada	9348533217	20.70876	85.97515
34	Prabir Das	Dehugada	7751944570	20.70584	85.97483
35	Sisira Das	Dehugada	7751944570	20.70567	85.97501
36	Nabina Samal	Dehugada	8984421196	20.70223	85.97792

37	Karunakar Behera	Dehugada	9583845968	20.70242	85.97733
38	Harihar pradhan	Champapur	9124987684	20.71469	85.95999
39	kailas ch.bhoi	Champapur	9437314661	20.71256	85.96671
40	Balakrishnha Bhoi	Champapur	969275010	20.71552	85.95801
41	Ramakanta Bhoi	Champapur	7853048113	20.71433	85.96115
42	Santosh Bhoi	Champapur	7328892119	20.71323	85.96284
43	Gandharba Bhoi	Champapur	9337491605	20.71322	85.96186
44	Ajit kumar Bhoi	Champapur	7848923460	20.71479	85.96906
45	Kangali Behera	Champapur	6371263372	20.71302	85.96578
46	Buaya Bhoi	Champapur	8928899363	20.71402	85.96899
47	Prasanto Bhoi	Champapur	9692192934	20.7144	85.96945
48	Shusant Bhoi	Champapur	7205488133	20.71355	85.96908
49	Rahas Bhoi	Champapur	9078392023	20.71418	85.961
50	Nanda Bhoi	Champapur	7854004552	20.71349	85.96285
51	Gandu Bhoi	Champapur	82499843297	20.71269	85.96516
52	Bichiratananda Bhoi	Champapur	9078392023	20.71485	85.97083
53	Raja Behra	Champapur	9391911348	20.71416	85.96297
54	Jugal Bhoi	Champapur	9827380492	20.71493	85.97048
55	Ratnakar Pradhan	Champapur	9078392023	20.71412	85.96329
56	Shrinibas Bhoi	Champapur	7008860581	20.71371	85.96341
57	Gokalananda Bhoi	Champapur	8018061735	20.71413	85.96332
58	Chandramani Bhoi	Champapur	8456040219	20.71405	85.96256
59	Purnachandra Sahoo	Khatua poda	9853692835	20.7341	86.05589
60	Prafula Barik	Khatua poda	9692733789	20.73467	86.05571
61	Akhaya Kumar Nayak	Khatua poda	9178593604	20.73756	86.0569
62	Ranjan Behara	Khatua poda	9777241126	20.73863	86.05721
63	Narayan Barik	Khatua poda	9658728289	20.73911	86.05703
64	Sudhakar Sahoo	Khatua poda	8895877452	20.73817	86.05582
65	Sabasi Sahoo	Khatua poda	9777172221	20.73847	86.05569
66	Gangadhar Sahoo	Khatua poda	9777336378	20.73562	86.05506
67	Dherandra Sahoo	Khatua poda	8658414160	20.73822	86.05539
68	Bira Sahoo	Khatua poda	9078384557	20.73763	86.05736
69	Khira Sahoo	Khatua poda	8260917181	20.73726	86.05643
70	Kulamani Sahoo	Khatua poda	N/A	20.73933	86.05693
71	Nila mani Sahoo	Khatua poda	N/A	20.74013	86.05663
72	Shukadad Nayak	Dehurigada	N/A	20.70323	85.97777
73	Kalandi Nayak	Dehurigada	9692415044	20.70359	85.97807
74	Ranjan Nayak	Dehurigada	760978586	20.70403	85.97581

75	Jayanta Nayak	Dehurigada	8455037092	20.70349	85.978311
76	Kashani Nayak	Dehurigada	8455037092	20.70434	85.975681
77	Balakrishna Nayak	Dehurigada	8144979810	20.72046	85.978569
78	Kunja Nyak	Dehurigada	8455044247	20.70357	85.9755
79	Babina Nayak	Dehurigada	7684066482	20.70265	85.978444
80	Rajit Nayak	Dehurigada	9861704557	20.70336	85.976992
81	Sridhar Nayak	Dehurigada	9692415044	20.70421	85.976078
82	Santhosh Kumar Bhoi	Champapur	8917358871	20.71501	85.971356
83	Bimal Bhoi	Champapur	8637215726	20.71519	85.970169
84	Pramod Bhoi	Champapur	8917238890	20.71315	85.969572
85	Kabi bhoi	Champapur	7846990950	20.71495	85.962128
86	Maheshwar Bhoi	Champapur	9692767377	20.71425	85.960367
87	Maheshwar Bhoi	Champapur	9692767377	20.71473	85.960231
88	Keshab Bhoi	Champapur	9124368613	20.71522	85.962269
89	Utsab Bhoi	Champapur	8260562341	20.71545	85.962528
90	Hadibandhu Bhoi	Champapur	6371070338	20.71496	85.961739
91	Shusanta Bhoi	Champapur	8917238890	20.71486	85.961333
92	Shesha Behera	Champapur	9040272998	20.71401	85.963644
93	Kabita Bhoi	Champapur	6372703268	20.71429	85.970222
94	Ramakanta Bhoi	Champapur	9398923808	20.71402	85.959975
95	Manasi Bhoi	Champapur	8847827971	20.71356	85.960097
96	Janaki Bhoi	Champapur	8847827971	20.71441	85.969792
97	NirmalaBhoi	Champapur	8847827971	20.71411	85.959206
98	Anjali Bhoi	Champapur	9692046971	20.71454	85.962792
99	Nrupati Bhoi	Champapur	9861579912	20.71468	85.96255
100	Prafulla Dehuri	Gadimagura	9337132929	20.73156	86.028472
101	Bilasi Samal	Gadimagura	7381966399	20.72973	86.032994
102	Jyoshna Samal	Gadimagura	9078919368	20.73074	86.032633
103	Manasi Dehuri	Gadimagura	9622352939	20.73289	86.027886
104	Nehega Dehuri	Gadimagura	8763328593	20.73242	86.028422
105	Kamala Samal	Gadimagura	N/A	20.7306	86.033908
106	Sanjani Samal	Gadimagura	N/A	20.72924	86.032994
107	Jhili Samal	Gadimagura	7854812884	20.73054	86.034281
108	Promod Dehuri	Gadimagura	9938021205	20.73244	86.027969
109	Upama Dehuri	Gadimagura	8249546328	20.73186	86.027697
110	Gita Dehuri	Gadimagura	8260462807	20.73009	86.0357
111	Renu Maharana	Gadimagura	9771691140	20.72969	86.035625
112	Kanachan Dehuri	Gadimagura	8763328593	20.72948	86.035342

113	Bapi Malik	Gadimagura	9556043646	20.73031	86.032525
114	Beni Mallik	Gadimagura	N/A	20.73044	86.032744
115	Damayanti Maharana	Gadimagura	8018664849	20.7258	86.046597
116	Sabita Ojha	Gadimagura	8249283615	20.73078	86.034769
117	Manju maharana	Gadimagura	9178079165	20.72597	86.047111
118	Sabita Bahalia	Gadimagura	9668165759	20.72594	86.04635
119	Guru Dehuri	Gadimagura	9348292044	20.73137	86.027864
120	Uma Dehuri	Gadimagura	96926341181	20.73083	86.028156
121	Rita Dehuri	Gadimagura	8249204711	20.72561	86.045878
122	Rodhana Dehuri	Gadimagura	8458021895	20.72923	86.035336
123	Prabhati Dehuri	Gadimagura	8658456047	20.73053	86.035242
124	Bimbali Dehuri	Gadimagura	8917533752	20.73048	86.028753
125	Dulana Dehuri	Gadimagura	9040271297	20.72882	86.033472
126	Gitarani Dehuri	Gadimagura	8093492069	20.72987	86.032303
127	Mamini Dehuri	Gadimagura	6370196718	20.73088	86.028844
128	Malati Dehuri	Gadimagura	8144654998	20.73123	86.028494
129	Joli Dehuri	Kampira	8926049983	20.74763	86.035686
130	Sumitra Samal	Kampira	8926031088	20.74882	86.035567
131	Laxmipriya Biswal	Kampira	9124945168	20.74787	86.037906
132	Sailabala Guru	Kampira	8260866844	20.74845	86.037678
133	Bidu Jena	Kampira	8260140301	20.74887	86.037992
134	Kalyani Samal	Kampira	934868145	20.74911	86.035375
135	Gitanjali Samal	Kampira	9853244534	20.74937	86.037453
136	Ranjita Jena	Kampira	7653047916	20.74818	86.038053
137	Sabita Samal	Kampira	8658723203	20.74943	86.036964
138	Jharana Samal	Kampira	9777515145	20.74826	86.035403
139	Sita Samal	Kampira	8114917525	20.74771	86.036842
140	Anita Pradhan	Kampira	9777271244	20.74925	86.036814
141	Dali Samal	Kampira	9937340554	20.74955	86.03655
142	Barsha rani Sethi	Kampira	9777131185	20.74963	86.036103
143	Sarojini Samal	Kampira	8144717914	20.74856	86.035067
144	Janaki Ojha	Kampira	77355817124	20.74875	86.037617
145	Malati Sahoo	Kampira	N/A	20.749	86.037181
146	Kamini Maharana	Kampira	N/A	20.74719	86.035906

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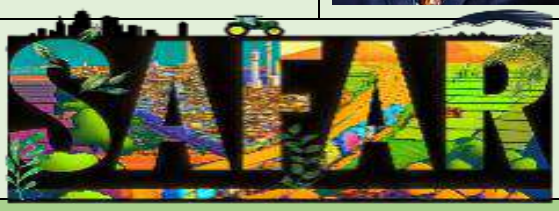

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