

## SUCCESS STORY ON IMPROVEMENT OF SOIL FERTILITY STATUS BY LIMING UNDER FOCUS-SERCHHIP

(In Convergence with Soil Health Card Scheme)

### PROFILE

**Activity** : Application of Slaked Lime (under Wetland Rice Cultivation)

**Project** : FOCUS, District Management Unit- Serchhip

**Funding**: International Fund for Agricultural Development (IFAD)

**District** : Serchhip

**Amount** : Rs 27,000 (per ha)

### BACKGROUND AND RATIONALE

The soil type of Serchhip district with the rest of Mizoram is found to be red and lateritic soil with sandy to clay loam in texture. The soils of Mizoram are mostly high in available Nitrogen (N) and Organic Carbon (OC) %, low in available Phosphorous (P) and medium to high in Pottasium (K) content. Due to high annual rainfall in the district (avg. 1680 mm), the bases or salts are leached out from the soil, leaving behind more stable materials rich in iron and aluminium resulting in acidic soils. Aluminium is the most abundant component in the cultivated soil and considered as one of the primary cause of low rice productivity in acid soil if it is found in high concentration.

The average pH value of Mizoram soils varies from 4.1 to 5.9 (Misra and Saithantluanga, 2003). Soil acidity is one of the major constraints that retard production of rice in many parts of the world. The optimum pH (measured in the solution of submerged soil) for rice (*Oryza sativa*) is about 6.6. An acidic soil reduces microbial activity resulting in reduced available nutrient for plants. Thus certain reclamation method needs to be considered for elevating the production drop due to soil acidity.

### LIMING (APPLICATION OF SLAKED LIME)



Liming is commonly used to improve the productivity of acidic soils in agricultural systems. It is an effective practice to stabilize soil organic matter content, improve nutrient mineralization rate and to enhance plant growth. Farmers apply slaked lime to their soil as a measure of soil reclamation and to improve the quality of the soil. The main benefits of liming include increasing the pH of acidic soil, increases nutrient availability, improved soil structure, and increased rates of infiltration. It provides a source of calcium for plants it improves the uptake of major plant nutrients (nitrogen, phosphorus, and potassium) of plants growing on acid soils. Liming in combination with ploughing and drilling

has also resulted in significantly higher total nitrogen leaching.

## ACTIVITY IMPLEMENTATION

### Training on Soil Sample Collection Techniques (Under Soil Health Card Scheme)



Training on Soil Sample Collection Techniques was conducted for DMU-Serchhip staffs under the Soil Health Card Scheme on 22<sup>nd</sup> November, 2019 at Farmers' Training Hall, Serchhip. Pi Lalenzami Haolai, Dy Director (Soil Science) mentioned about the scheme, the implementation and the coverage of Serchhip District. The importance of soil health and guidelines for conducting of soil sample collection were covered by Pi Zodinpuui, Asst. Soil Chemist. She also made the gatherings aware of the necessary records to be maintained when collecting soil sample. The training greatly benefitted the technical staffs as practical knowledge was gained which could right away be utilized in implementation of the project activity.

### Soil Sample Collection





To establish the fertility status of the soil and understand the need to implement the activity, soil samples were collected from fields in and around Serchhip villages where slaked lime was proposed to be applied. A total of 69 samples were collected and sent to the Soil Testing Lab, Directorate of Agriculture, Aizawl, where the samples were tested free of cost for the project under the Soil Health Card scheme.

### Soil Analysis (Before Liming)



The result of soil tested before slaked lime application could be interpreted as below;

Parameters	Result	Rating
pH	4.1-4.5	Acidic
Organic Carbon (%)	>0.75	High
Available Nitrogen (N) in kg/ha	250-450	Medium
Available Phosphorous (P) in kg/ha	<10	Low
Available Pottasium (K) in kg/ha	<110	Low

(Rating: Tamil Nadu Agricultural University)

The results indicated that the soils were acidic in nature, high content of organic carbon and medium content of available nitrogen, whereas available phosphorous and potassium were found to be low.

**Application of slaked lime (with ploughing, drilling and planking)**



Soil fertility management by application of slaked lime with ploughing, drilling and planking was initiated for the farmers under WRC FIGs. The amount for ploughing, drilling and planking taken up by the farmers were also financially supported for hiring rotavators and chisel ploughs.



### Soil analysis (After Liming)

Soil samples collected after application of slaked lime was again sent for testing. The result of 76 samples could be interpreted as below;

Parameters	Result	Rating
pH	5.5-6.5	Acidic
Organic Carbon (%)	>0.75	High
Available Nitrogen (N) in kg/ha	>450	High
Available Phosphorous (P) in kg/ha	11-12	Medium
Available Pottasium (K) in kg/ha	110-280	Medium

The result indicated that liming did have a positive impact on the soil status. Not only was the pH of the soil increased to an extent considered optimum for rice cultivation (i. e 6.6) according to previous studies. It is also evident that due to the increase in pH level as a result of liming, increase in microbial activity for decomposition was reflected by the increase in available NPK.

### CONCLUSION

The interpretation of the results showed that liming optimizes the pH and increases the nutrient availability for plants, which increases the productivity of crop. Further comparative study can also be conducted from the yield recorded. This activity thus proved a simple and easy method that can be followed by farmers in maintaining his soil health while increasing production.