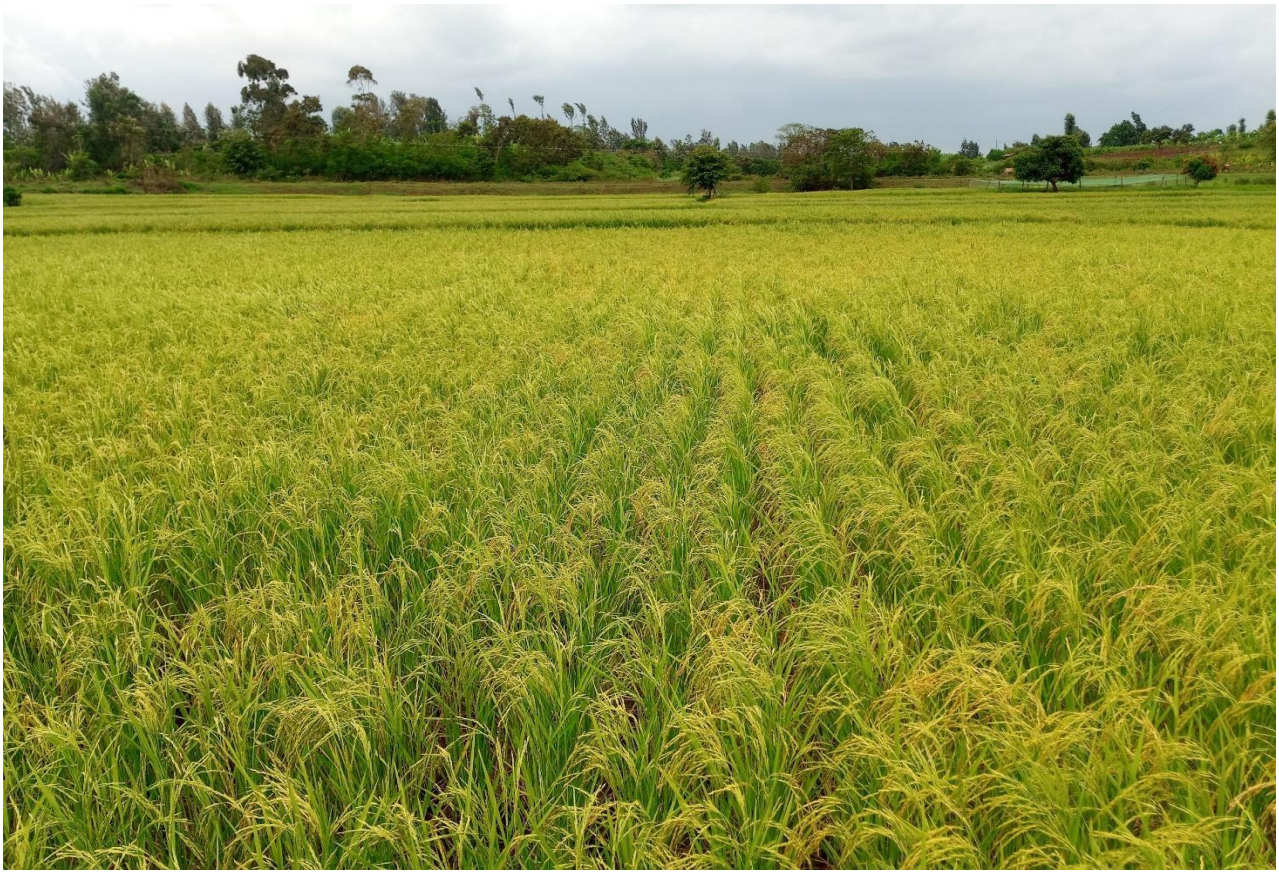
RICE HARVEST REPORT



Silgrow Field Demonstration and Report by; Beth Ngure - Agronomist

Prepared for – FABRO LIMITED, Nairobi Kenya

RICE (Oryza sativa L.)

Introduction

Rice (Oryza Sativa) is an edible starchy cereal grain and the grass plant (family Poaceae). Rice production in Kenya is done mainly under irrigation about 95% of total production is done in paddy schemes most of which is managed by the National Irrigation Board (NIB). Rice production encompasses various steps namely; sowing, seedbed preparation, seedling production, main land preparation, transplanting, water management (main field), pest and disease control, weeding, harvesting, threshing, winnowing, drying and storage.

There are various rice varieties in Kenya grown mainly depending on the region, the main varieties include; the irrigated varieties, low land rainfed and the rainfed upland varieties.

Ecological Requirements.

Rainfall: 800 – 2000mm annually

Altitude: 0 – 1700m above sea level

Temperature: 21-36 degrees Centigrade

Soil: Sandy Loam to clay

PH: 4.5 – 7.0

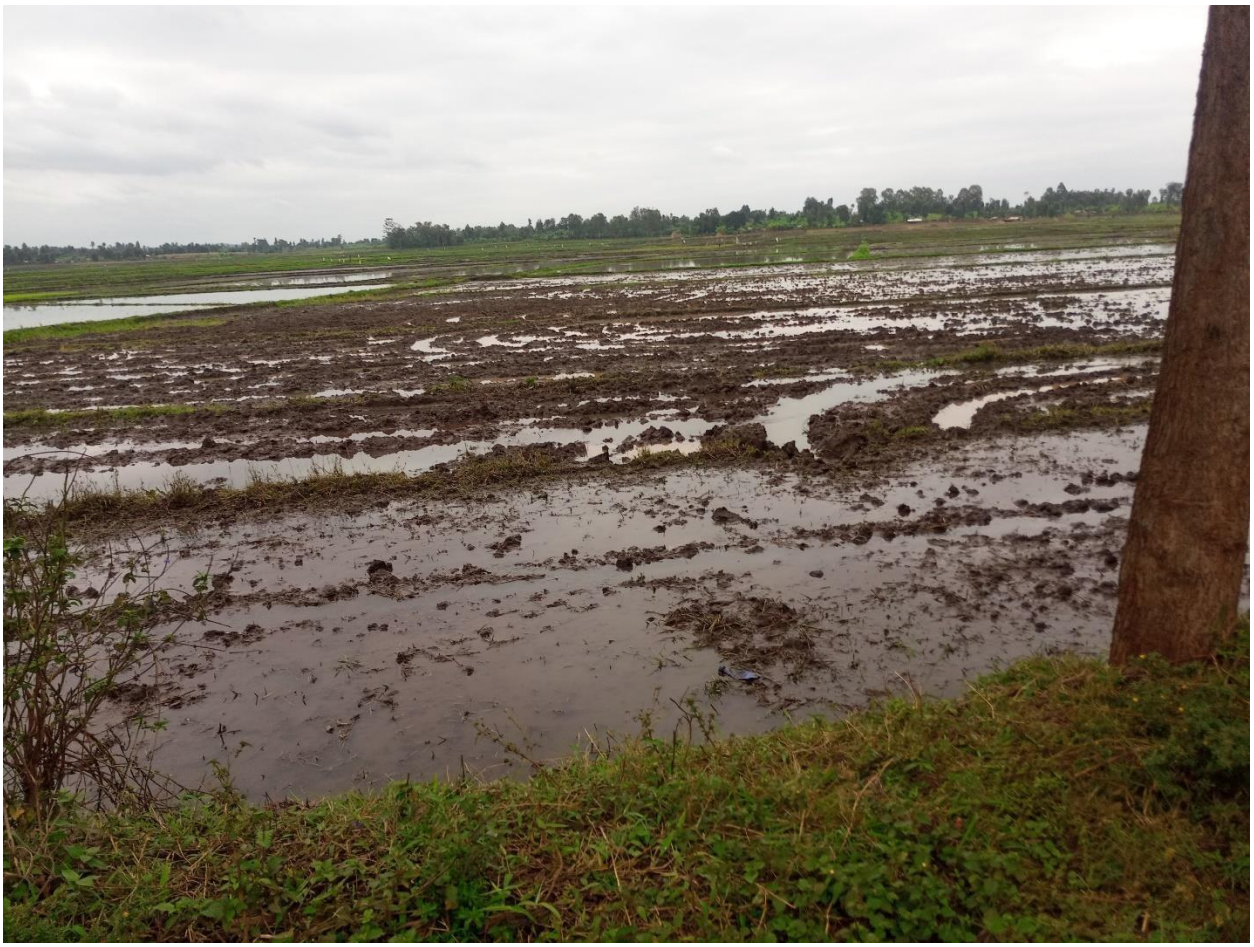
Silgrow Demonstration Overview

The following is a report highlighting the effect of applying Silgrow on rice and its effect on yield and yield attributes. The demonstration was done in Nyangati village, Kirinyaga County over a period of 4 months. Four applications were done at the rate of 400ml Silgrow per acre. 40ml Silgrow was mixed in 20 Liters of Water.

The Silgrow Demonstration was done in Mwalimu Muchiri's farm. The demonstration area was a 0.35 of an acre. Historical yield of SILgrow parcel of land had been well documented for yield comparison.

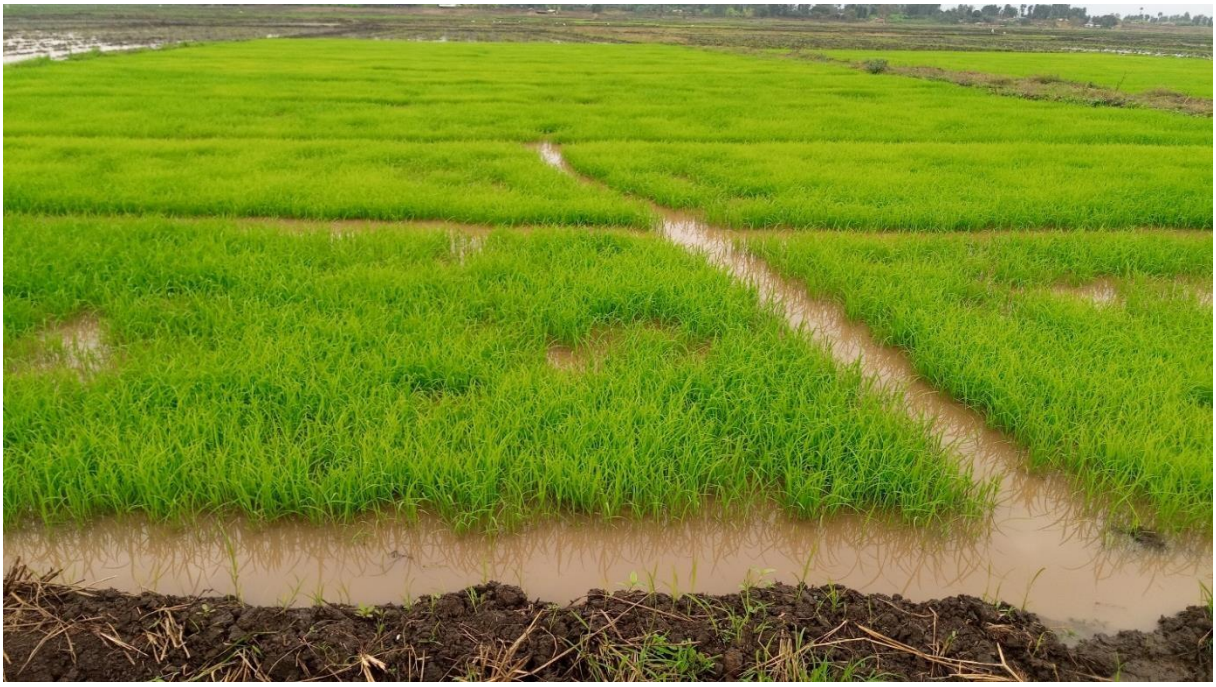
Observations

Picture Comparison Between Applications

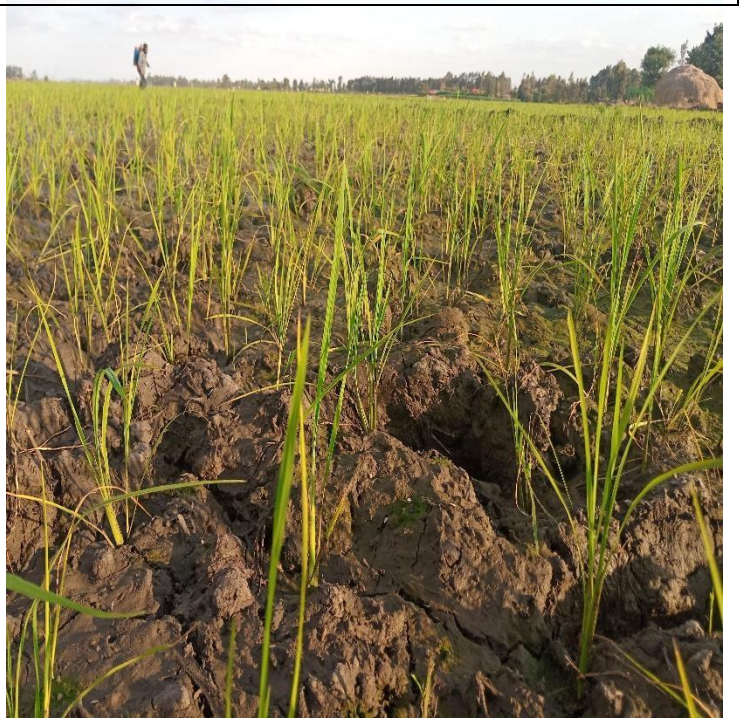


Demo and Control Blocks Flooded before transplanting.

NOTE: The first Silgrow application on the demo area was done after the land was drained before planting.



Rice Nursery

Control – 2nd Application	**Silgrow Demo – 2nd Application**
	

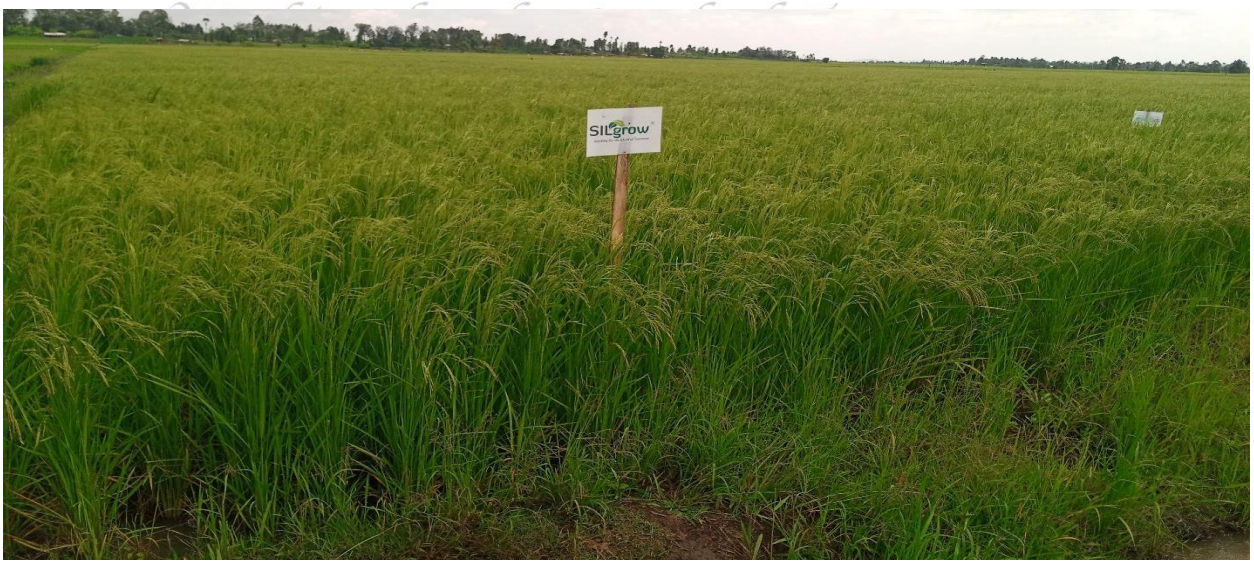
Observation During Third Application

Control	Silgrow
	

Observation During Fourth Application

Control

Silgrow



Below is the Control Block prior to harvesting.

Below is the Silgrow prior to harvesting

DISCUSSION

Below is a general discussion of the scientific basis of Silgrow's performance on rice growth and yield.

Tillering and Root Development Comparison.

Above are plant samples uprooted from the Silgrow (right) and control (left)

The root sample from SILgrow site had more extensive root system compared to the sample from the control block. The extensive root systems perform many functions that aid in the general growth and development of the crop. A crop with more elaborate root system has an enhanced anchorage, water retention and nutrient uptake. Better uptake of soil nutrients is crucial for plant growth and productivity.

Application of Silgrow aids in nutrient activation such as phosphorous which is key in root development. With abundance of Phosphorous in the soil, a crop growing in the Silgrow area therefore develops a superior root system.

With a better root system, the crop also develops greater tillering (vegetative matter) which translates to more rice panicles and in turn better yields.

Effects of Silgrow application on Rice

Foliar application of water soluble silicon encourages the absorption of micronutrients required in small amounts by plants. In rice, it has been determined that foliar application of Silgrow causes a greater absorption of Phosphorous (P), Potassium (K), Calcium (Ca), Magnesium (Mg), Iron (Fe), Zinc (Zn), Copper (Cu) and Sulfur (S).

Silgrow is a product that contains water soluble silicon. It is formulated to improve levels of soil fertility and simultaneously facilitate the absorption of nutrients through the plant root system, as a result of its incorporation of amphoteric product and promotion of the exchange of

electrical charges of the elements in the soil, enriching the solution thereof and increase the cation exchange capacity (CEC) and thus soil fertility.

That is why the chemical-ionic interaction of soluble silicon interaction permits better mobility of minerals, nutrients, carbohydrates, secondary metabolites and proteins through plant cells and tissues; which promotes metabolic processes and which induce the plants to have higher growth, higher biomass production, increased productivity and yield.

Simultaneously Silgrow increases the enzymatic and microbial activity, stimulating the development of microbial soil flora which tends to increase fixation and assimilation of nitrogen (N2) by means of the nitrogen-fixing soil bacteria (Mycorrhizae, nitrobacter, Rhizobium, Azospirillum, Algae etc). These microorganisms play an important role in the dissolution of silicon, so they contribute to the mobilization thereof in conjunction with other minerals through the root system of plants, given the processes of decomposition of soil organic matter by microbial flora.

Application of Silgrow promotes root system of plants, which is observed in the greater development, size and diameter of roots. Formulated on the basis of silicon, Silgrow is water soluble, and contains; Ca, Cu, Fe, Mg, Mn, Na, Fulvic and humic acid.

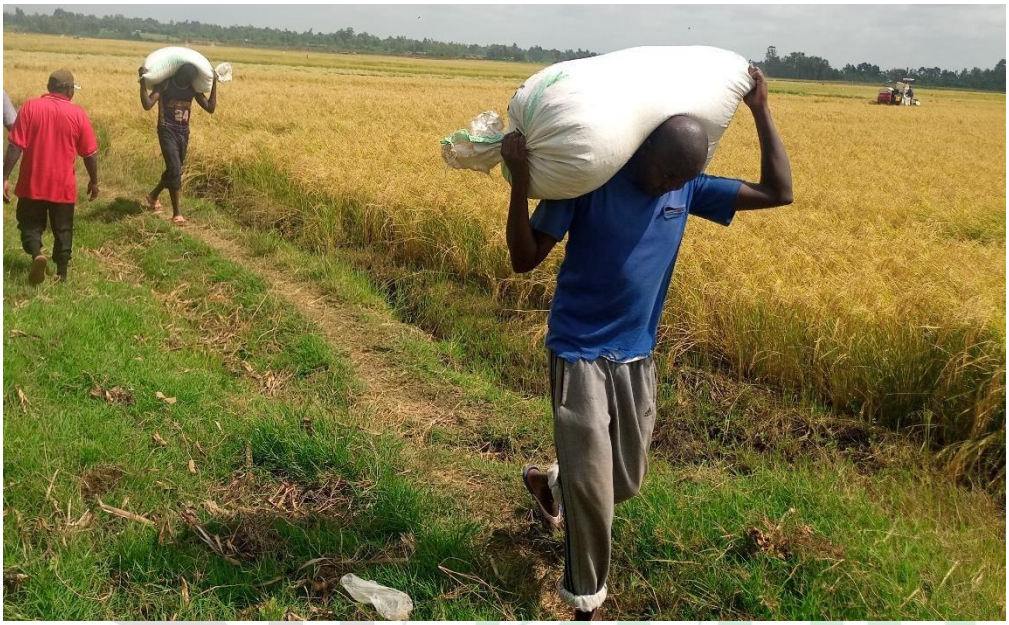
Silgrow is:

- Biodegradable
- Microbial stimulant
- Non-acidic, non-flammable and non-toxic

- Soluble in water
- Non- carcinogenic

Rice (Oryza sativa L.) is a plant that accumulates silicon(Si) which is absorbed in large amounts, where it has been determined that its content may vary from 10%to 20%, accumulating mainly in leaves and stem. Research shows that the application of silicon may be essential for the growth of rice plants. A crop with 5MT/ha usually takes 250-300kgs Si/ha. Soluble silicon is absorbed through the absorbent hairs of the roots of the rice plant (secondary roots) as orthosilicic acid, contributing to the increased yields and grain quality, and encouraging the development of the immune system of plant, to promote tolerance thereof to biotic and abiotic stresses.

Yield and Yield Attributes



Above are ten 100kgs bag harvest from the SILgrow area. (o.36 acres)

Historical harvest data from SILgrow portion was an average of 8bags of rice (800kgs).

The yield after the application of Silgrow was 10 bags (1000kgs). The application of Silgrow resulted to an increase of 200kgs of rice (16.67% increase)

With a 17% increase in yield;

One Acre = 24 bags (2400kgs) – Without Silgrow

One Acre =28bags (2800kgs) – With Silgrow

Financial Assessment	
Control	**Silgrow**
Expected Yield from 1acre Rice field = 24 bags (2400kgs) Yield from a standard control = 2400kgs Farm gate rice price = Ksh. 8500 per 100kg bag Returns from 1 acre = **Ksh. 204,000**	Expected Yield from 1acre Rice field = 24 bags (2400kgs) Yield from a standard control = 2400kgs Farm gate rice price = Ksh. 8500 per 100kg bag Total yield per acre with Silgrow= 28 bags (2800kgs) 400kgs increase in yield Approx. 17% Yield Increase =400kgs Returns from Silgrow application – **Ksh**. **238,000** Standard Returns from control **– Ksh. 204,000** **Extra Income with Silgrow application – Ksh. 34,000**

In rice, the beneficial effects as a result of Silgrow application were; increased grain yield, greater numbers of stems/plant (tillering), a higher dry matter content, more erect leaves, increased chlorophyll content, and increased penetration of sunlight which increases the photosynthetic activity of the leaves as well as an increased number of panicles, increased number of spikelets and a reduction of empty grains due to a higher percentage of whole grains per panicle.

With a 17% increase in yield, superior quality and subsequent reduction in input such as fertilizer, rice farmers will greatly benefit from the adoption of Silgrow in their farming regime.