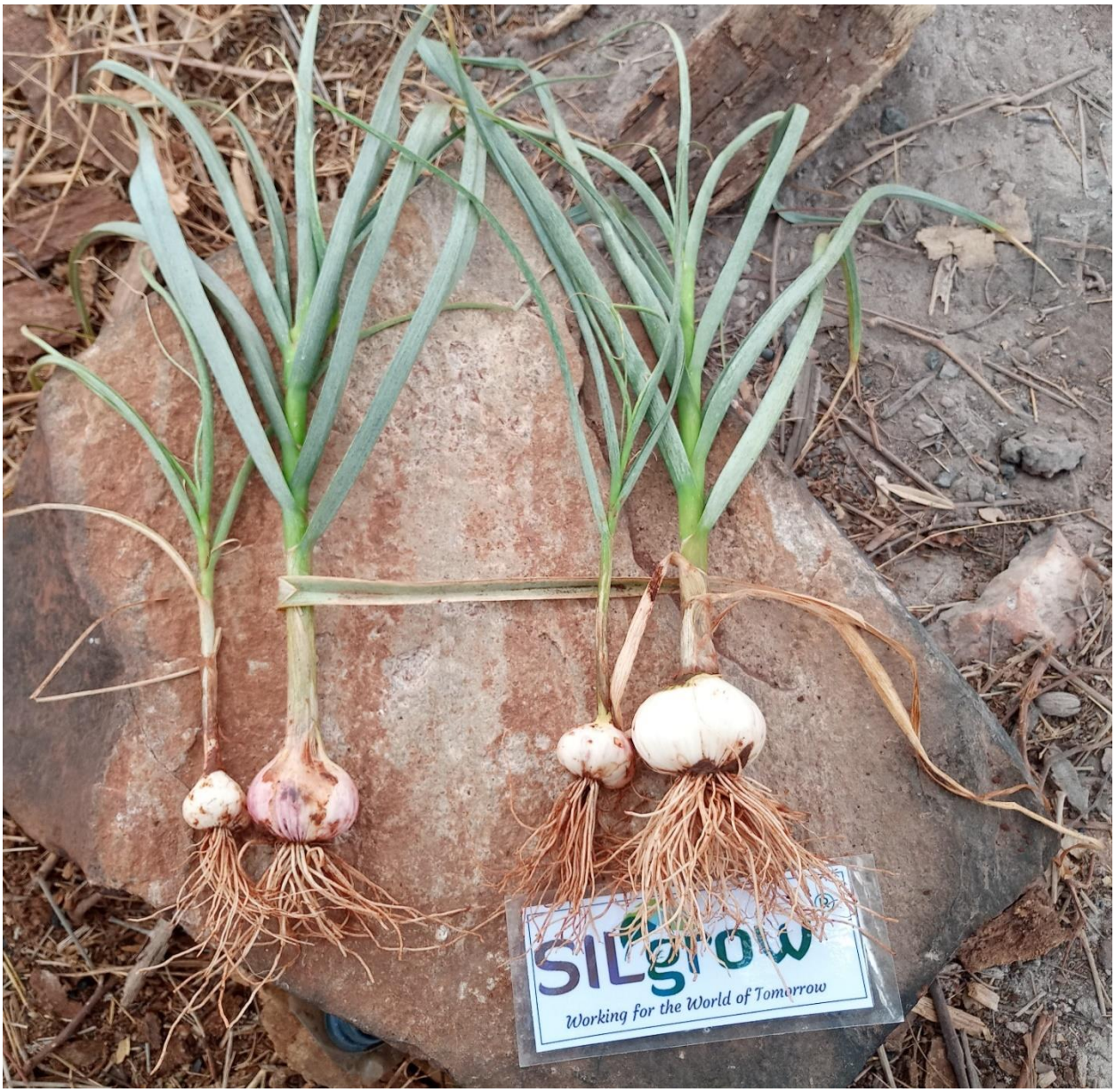
GARLIC REPORT

Region:	Machakos County, Kenya
Lat/Long (dec):	**-1.40983,37.56358**
Latitude:	1° 24' 35" S
Longitude:	37° 33' 48" E
Area of application	3 Rows (each 80m long)
Row Names	Upper Row -5 Lower Row – 3 & 4
Volume of Silgrow used	400ml per application
Crop	Garlic

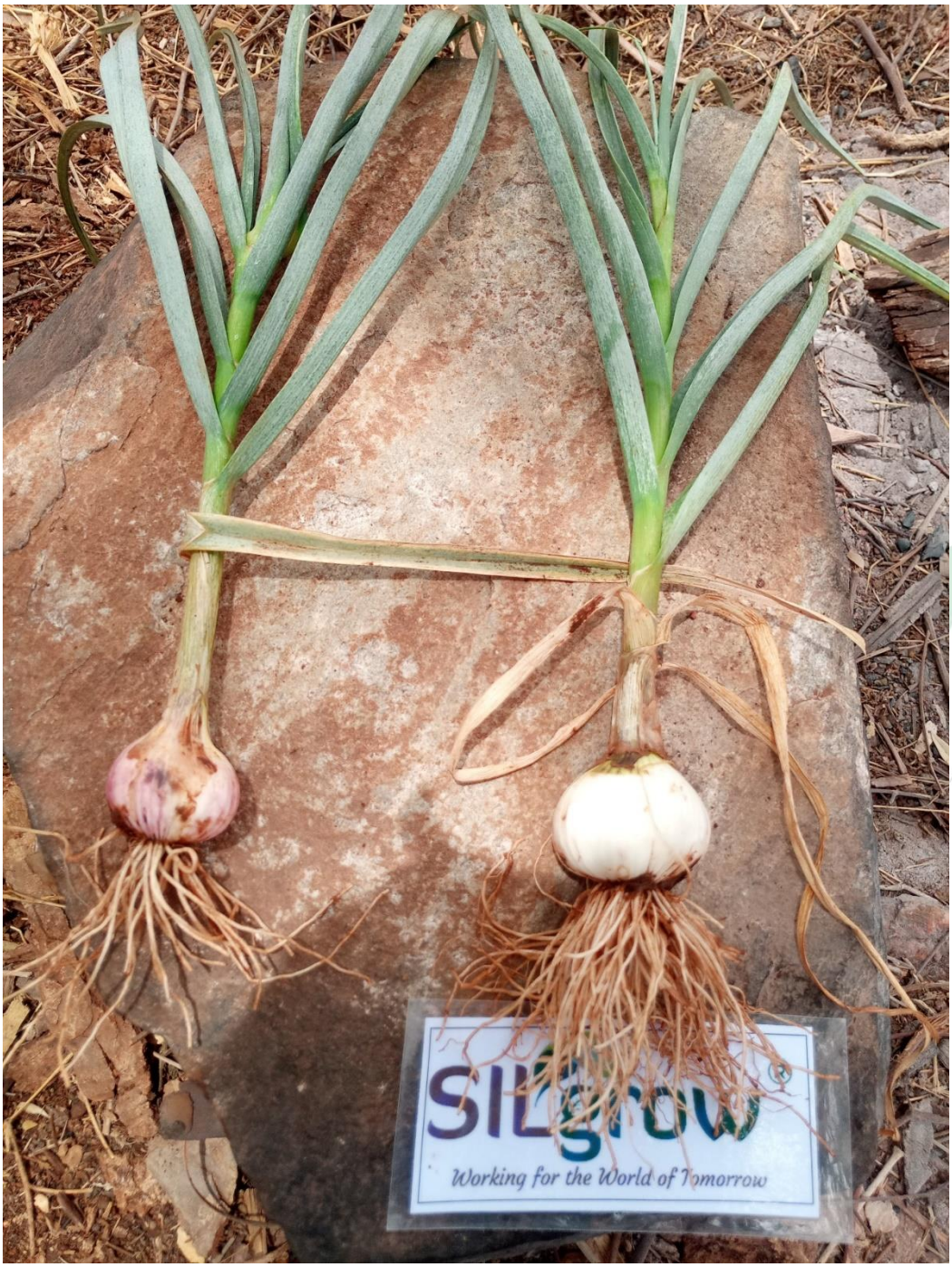
OVERVIEW

The Silgrow demonstration on garlic was carried out starting from 29th July 2022 (1st application) and closed on 7th October 2022 (4th Application). A total of four applications were done each using 400ml Silgrow per application. Throughout, the mode of application was manual application using buckets. Parameters such as foliage appearance, growth vigor, and resilience to extreme temperatures were observed. During the 3rd application done on 7th October 2022, the crop was at the bulb formation stage, samples were uprooted to assess root formation for comparison between the control and demo samples. Harvest was done some weeks earlier than anticipated due to some challenges at the farm. The harvest and data collection were done on 1st November 2022.

ASSESSEMENT OF UPROOTED GARLIC



Sample uprooted from Silgrow (right) and Control (left)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Root Development

NOTE: The roots from samples uprooted from the Silgrow demo had extensive roots compared to the control sample which is an indicator of abundant nutrients.

Root Development*:*

Plant root systems perform many essential adaptive functions including water and nutrient uptake, anchorage to the soil, and the establishment of biotic interactions at the rhizosphere. Changes in the architecture of the root system, therefore, can profoundly affect the capacity of plants to take up nutrients and water. From the results obtained above, a Silgrow-grown crop will have a better root architecture compared to a crop without Silgrow.

The roots from the Silgrow demo had extensive roots as seen in the pictures above; the many roots enhance water retention, enhance anchorage, and nutrient uptake.

The roots from the control were fewer; an indicator that the growth media/soil lacked an abundance of nutrients, especially phosphorus; essential in root formation hence the crop produced fewer roots.

Soil nutrients are critical elements for plant growth and productivity. The bioavailability of nutrients in the soil solution determines root growth, root proliferation, and specific functional responses that depend on the prevailing nutrient status of the plant.

Nutrient activation and Uptake

Relevance:

Among the key benefits of Silgrow is nutrient activation; As Silgrow is mixed with water and applied to the soil, a positive and negative electric charge is released. The charge activates nutrients in the soil occurring naturally and those applied from other sources such as organic/ inorganic fertilizers. The activated nutrients in turn play their specific roles in the growth of the crop.

Silgrow application on the soil creates Monosilicic acid which then is absorbed through the roots. Once absorbed, the phloem becomes mellow (succulent) enhancing uptake. This factor speeds up the absorption of other nutrients provided in the regime example; from fertilizer or manure. This factor also plays into Silgrows' ability to create an electric charge that activates the nutrients that have been inert in the soil. Together with enhanced photosynthesis, the growth rate of plants is dramatically accelerated.

DISCUSSION

The garlic on the demo blocks appeared greener, more upright, and had stronger stems compared to garlic on the control blocks throughout the growth cycle. Being a bulb crop, yield in Garlic cannot be quantified by leaf appearance. However, more vibrant leaves and more upright and stronger stems indicate accelerated growth. At the bulb development stage, garlic with a more vibrant appearance will indicate better and bigger bulb formation which translates to better yields and quality.

HARVEST DATA

Harvest was done on Tuesday 7th October 2022. The harvest exercise was interrupted by the heavy rains experienced in the area. Silgrow was applied on 3 rows; during the harvest, produce from one of the rows got mixed up with the controls. However, produce from one of the Demo rows was harvested separately and compared with a similar row from the control blocks.

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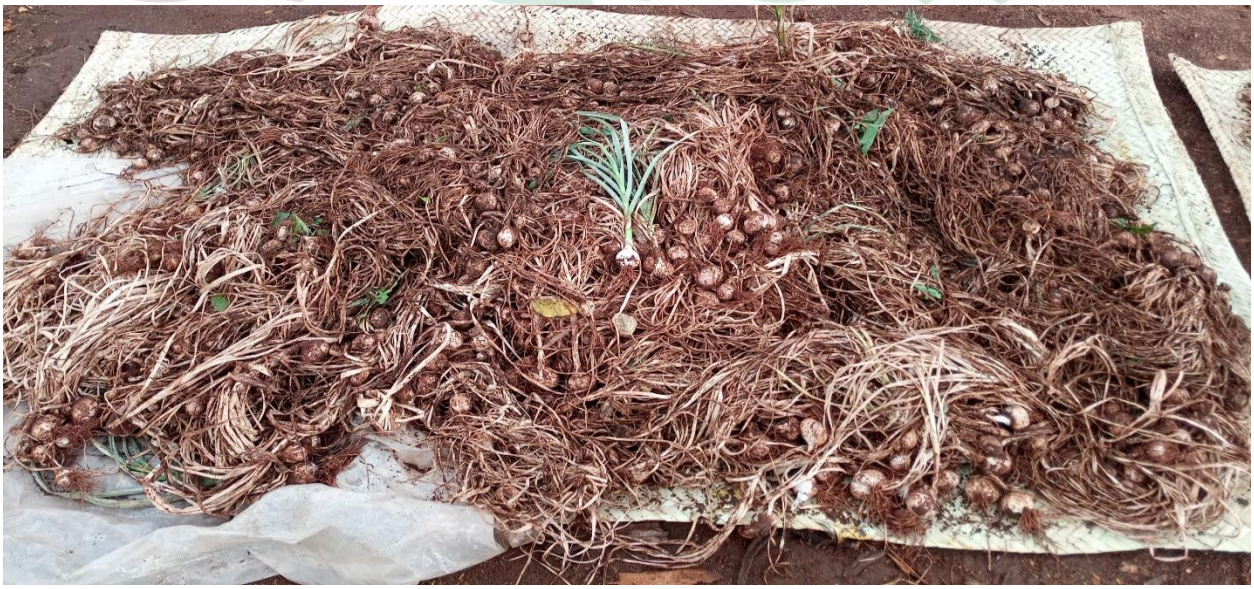
Above Garlic harvested from the Silgrow demo row



Above - Garlic harvested from the control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Discussion

The pictures above are ten representative samples from the demo and control rows. The Silgrow bulbs had a bigger diameter, were more uniform in size, and weighed more than those from the control block. The total number of garlic produced from the demo row was more compared to the total produced from the control row.

The weight from the Silgrow demo and control was the wet weight (leafy biomass, soil, and garlic). The exact weight of the dried garlic was determined after several days of drying.

Wet Weight.

Silgrow – **25kgs**

Control – **22.5kgs**

****Difference – 2.5kgs****

+11.11% increase – Wet Weight

Dry Weight

After sun drying the garlic for some days, the dry weight was weighed

Control	**Silgrow**
12.4 Kgs	**15Kgs**
Difference – 2.6kgs **%Increase – 20.9%**	

After drying, the garlic lost an average of 10kgs (the wet weight measurements made earlier consisted of soil, leaves, and the garlic bulb). There was a significant difference in weight between the Silgrow demo harvest and the control. The Silgrow demo had a yield increase of +20% increase which is a significant increase in total yield for any farmer whether small-scale or large-scale. The 20% increase as a result of using Silgrow has tremendous implications for revenue generation. For example, a small-scale farmer can be able to generate more income by utilizing a small area as opposed to the traditional approach of reclaiming more land to get more profits. For largescale farmers' the incorporation of Silgrow into their farming regime will be even more rewarding in terms of revenue generated from the garlic harvest.

CHALLENGES FACED

The garlic production in the whole farm was lower than the anticipated yield due to the extreme drought condition together with the lack of irrigation water for a short period. During this time, the garlic was infested by thrips and once the water situation was under control the leaves started drying which is an indicator of garlic reaching maturation but in this case, the leaves died off too early as a result of the stress.

CONCLUSION

Adoption of Silgrow by garlic farmers whether small-scale or large scale will be beneficial by giving a +20% increase in yield, more resilient crop, uniform growth, and better quality which translates to more revenue for the farmers.