Mud Slurry From Sugar Production Used As Fertilizer

A Research Paper Presented to the
Faculty of
Philippine Science High School-Western Visayas

In Fulfilment of the Requirements in
Science Research II

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Abstract

The study entitled, "Mud Slurry From Sugar Production Uses As Fertilizer", aims to determine the effect of mud slurry as a substitute fertilizer. Due to the existing problems on rice, corn was chosen as a testing medium. Soil analysis for pH, calcium and phosphorous was conducted and results showed that the soil before planting was acidic in nature but achieved the normal pH after lime was applied. Furthermore, the soil also contained calcium and phosphorous. Three treatments were prepared such as 750 grams of mud slurry per hill for treatment 1; 1500 grams of mud slurry per hill for treatment 2; while 3000 grams of mud slurry per hill for treatment 3 and a control of 100% garden soil. There are three replicates for each treatment and control. Fifteen days after the corn was planted, mud slurry was applied and a constant application was done every after fifteen days. Results showed that the average growth of corn plants on the control area were the highest among others. On the other hand, corn plants under treatment 3 showed the least effect of mud slurry in its growth.

Further studies are recommended.

Approval Sheet

The research paper entitled,"Mud Slurry From Sugar Production Used As Fertilizer", submitted by Consuelo Concepcion Gonzalez, Maria Salve Janagap and Marjee Rose Parreño in partial fulfillment of the requirements in Science Research II, has been examined and is recommended for acceptance and approval.

_____ _____

Date MRS. JOSETTE T. BIYO

Science Research II Adviser

This research paper is accepted and approved in partial fulfillment of the requirements in Science Research II.

_____ _____

Date PROF. REBECCA V. YANDOG

PSHS –WV Director

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Acknowledgement

Past mistakes can't be altered

Future pitfalls maybe avoided.

-SOW-

Success at hand is quite an honor. But on your way up there, troubles and unfavorable circumstances are being experienced. By this, the researchers would like to thank some persons who in some way or the other helped them survive the challenges met.

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CHAPTER I
INTRODUCTION

A. Rationale of the Study

The soil productivity is determined in no small degree by the nature of its subsoil. By proper cultivation and the incorporation of organic residues, its physical condition maybe modified.

Philippine soil nowadays, become less and less productive because of lack of nutrients in it. Mostly, farmers use commercial fertilizers in order to increase their products and obtain a higher profit. They have noticed that instead of earning a higher profit they have lost a bigger amount. Constant use of inorganic or commercial fertilizer will lead to disastrous results that harden the soil and will lose the capacity to retain moisture.

Corn as the most important cereal in the Western Hemisphere has many local and regional names. It is also known as Zea mays. Corn is a coarse, annual plant of the grass family, Gramineae, that probably originated in tropical South America. In the Philippines, Cebuanos considered corn, as their primary staple food and also used as one of the feed ingredients for poultry and livestock. Most of the corn plantations are found in Eastern Visayas, Isabela, and some parts of Bukidnon, but the supply is very much insufficient to meet the demands of the country.

Mud slurry is a mixture of flocs, mud and filtrate. It is obtained from the waste product of sugar production. Usually, it is used as fertilizer on potted plants. To use mud slurry as a substitute fertilizer on corn plants catches the attention of many farmers who suffer from the very expensive prices of commercial fertilizer. It has been used as fertilizer on sugarcane plantations but

has less effect when it's applied purely as mud slurry alone, so they try to add commercial fertilizer to make it more effective.

In this study, the researchers have a primary objective of determining the effect of mud slurry on corn plants. It is to be hoped that this study will have a positive result, to help the farmers on their existing problem on fertilizers.

B. Problem of the Study

What will be the effect of mud slurry as a substitute fertilizer upon the growth of corn?

C. Objectives of the Study

To determine the effect of mud slurry, used as a fertilizer in the growth of corn in terms of height after 3 months of culture.

D. Hypotheses of the Study

Ho: There is no significant difference on the growth of corn plants as mud slurry is used as substitute fertilizer.

Ha: There is a significant difference on the growth of corn plants as mud slurry is used as a substitute fertilizer.

E. Significance of the Study

Mud slurry also called as mud press, is known to be the waste product from sugar production. With this belief the producer or the company that

produces sugar, dumps all the waste material on the rivers or canals which lead to the pollution of water.

Thus, this research may help minimize water pollution. Just take for example if this study would have a positive result, instead of dumping those mud slurries on the river the company can sell it on the right price. On the other hand, the study will be able to help the farmers to utilize their farmlands which they think useless because of its lack of nutrients in it. Using mud slurry as a substitute fertilizer will help the farmers realize that the lacking minerals maybe restored to the soil with the help of the newly discovered organic fertilizer, known as mud slurry.

Nowadays, fertilizers were getting expensive. This research will help a lot of farmers having problems about their land and as well as the money to buy fertilizers.

This study will also add a new knowledge to the public on how to use mud slurry as a fertilizer.

F. Scope and Limitations of the Study

The scope of this study ranges from the present knowledge about mud slurry up to the studies that are conducted regarding mud slurry. The mud slurry used was taken from Passi Central where abundant supply was present.

The study will be conducted at Janagap farm in Pavia, Iloilo, at the range of three months from September to December 1997 where the difference on the height of the corn plants can be observed clearly.

The corn seeds used re just the local tasseled corn taken from the latest production of Mr. Sergio Janagap for the benefit of the commoners and the local farmers. In the plantation, the researchers used a land with the measurement of 1x2 meters per row. The independent variables in this study are the proportions

of mud slurry and the soil while the length of the corn plants in terms of centimeters is the dependent variable.

G. DEFINITION of TERMS

1.) Calcium

- metallic element

2.) Corn

- Zea mays, a tall annual American cereal grass having a terminal staminate tassel and lateral pistillate inflorescence covered with protecting leaves
- cereal grain

3.) Fertilizer

-a substance used to enrich the soil
material that contains elements essential to plant growth that is added to soils to correct plant nutrient deficiencies

4.) Flocs

- a chemical precipitate

5.) Filtrate

- porous substance

6.) Mud Slurry

- mixture of flocs and filtrate

7.) Nitrates

-nitric acid; salts

8.) Subsoil

-the layer of material immediately beneath the soil in process of being broken up through the agency of water, plants, roots, worms, etc., but as yet not enriched by humus or by the products of bacteria.

CHAPTER II
REVIEW of RELATED LITERATURE

MUD SLURRY

Stephen Arisari (1995) lectured that mud slurry is a mixture of mud, flocs and filtrate. He also mentioned that hacienderos in Negros used mud slurry as a fertilizer to enhance the growth and yield of corn, however insignificant results were observed.

Sangatanan (1989) reported that in 1957 Aaron and Calora found out that the application of 30 to 40 tons of mudpress cake to hectare gave significantly higher yields of cane and sugar.

He also mentioned that in 1970, Covar reported that a filter cake is valuable fertilizer for phosphate deficient soils. Applied at the rate of 75 to 100 tons per hectare, it is equivalent to 500 kg. per hectare of ammophos (16-20-0), and leaves a residual effect of about one half the amount for the ratoon crop that follows. Mud press cake, consist of sugar-filter, sucrose, coagulated coiloids including cane wax, albuminoids, phosphate of lime, sand and soil. Physically, mud press is a soft spongy light weight ammophos, dark brown to black, with thin chemical composition; nitrogen ranging from 1.07 to 3.13 percent; phosphorous ranging from 1.34 to 6.30 per cent; potassium ranging from 0.02 to 1.77 percent; and organic matter ranging from 30.0 to 39.5 percent.

From the same book, he also stated that in 1969, Cheng and Hsia reported that the yield response to application of mud press on sandy soil was significantly higher both in plant and ratoon sugar cane over the control field.
Sangatanan (1989) stated that in 1968 Chu demonstrated that the application of filter cake at the rate of 80 tons per hectare (wet basis) as a mulching material resulted in cane yield increase of 20 to 30 percent.

Sangatanan (1989) was able to mention that in 1979, Wang and Chang indicated that the yield of sugar cane was increased by an average of 10 percent when sand gravelly soil was applied with organic-tablet fertilizer which was made by mixing fertilizer with filter cake at proper ratio. He also added that from the same year, both were able to make an experiment on the effect of soil innoculant on sugar cane growth was improved when it was incorporated with a few tons of filter cake. Since filter cake or mud press contains an abundant amount of organic matter, it could serve as a carbon source for green algae, bacteria and fungi which are supposed to be present in soil innoculant.

CORN

Lowmer (1995) defined corn as a tall annual American cereal grass having a terminal staminate tassel and lateral pistillate in florescence covered with protecting leaves.

A group of researchers called Master of Arts in Elementary Agriculture or MAT(EA) (1987) stated that corn crop is second in value as a staple crop is the most highly valued crop of all the cereal grain because of its invaluable and multifarious uses. About five million or more inhabitants in Cebu, Eastern Visayas, Southern and Western Mindanao and the upper Cagayan alley use in the crop as the principal item of their foodcrops. They also mention that corn Is being utilized as a human food, as an animal feed, and as a raw material in industries.

They also mentioned that all corn plants whether the traditional varieties or even the new and improved UPCA corn varieties respond well to nitrogen fertilizers. Most commercial fertilizers are good sources of nitrogen for corn especially ammonia sulfate and urea. However before using and applying any kind of fertilizer it is important that the soil be analyzed and in the absence of soil analysis fertilizer with 60 to 100 kilos of nitrogen about 30 to 45 kilos of

phosphorous per hectare should be applied. Studies from University of the Philippines College of Agriculture (UPCA), Los Baños and Bureau of soils, Manila showed that most Philippine soils are not deficient in potassium.

Pamplona et al. (1988) reported that the influence of various fertilizer rates on the growth and the yield of hybrid corn was evaluated in Kabacan. He also mentioned that the application of varying rates of fertilizer increased the yield of two corn hybrids. The lowest yield of 10.36 t/ha was obtained in plants fertilized with 150-60-60 kg of NPK/ ha. Yield was further increased to 10.79 and 10.67 t/ha when fertilizer was increased to 250-150-150 and 500-300-300 kg NPK/ha respectively. The kinds of fertilizer used in corn were, nitrogen and bacterial fertilizers.

A. Bacterial fertilizers

During the 1987-88 dry season on corn at University of the Philippines Los Baños (UPLB), B PGPR seed treatment in increased the dry to p weight by 12-15% and dry seed yield by 24-43% depending on the isolates used. The number of corn ears of plants from PGPR-treated seeds was significantly higher than that of the control.

B. Nitrogen fertilizers

A study evaluated the effects of the different levels of nitrogen on the yield of corn under alkaline soil and condition in Dao, Bohol.
Results showed that application of 30 kg N/ha in Dao soil increased the yield by 12.8% while 120 kg and 150 kg N/ha produced 34% yield increase.
A similar study conducted at Department of Agriculture (DA) Iligan Experiment Station and Solanan, Cagayan determined the response of corn to nitrogen fertilizer application under zero tillage condition (Perdido and Tumamang, DA-IES).

In Iligan, two fertilizer rates, namely: 90-30-30 yields of 3.49 and 3.33 t/ha respectively. Control gave 0.975 t/ha.

Soil and Organic matter

Brady (1974) reported that soil is a dynamic natural body on the surface of the earth in which plants grow, composed of mineral and organic materials and living forms. It is also a collection of natural bodies occupying parts of the earth's surface that support plants and that have properties due to integrated effect of climate and living matter acting upon parent material, as conditioned by relief, over periods of time.

On the other hand, Lowmer (1995) mentioned that a soil has its subsoil. However, he defined subsoil as a layer of material immediately beneath the soil in process of being broken up through the agency of water, plants, roots, worms, etc., but as yet not enriched by humus or the products of bacteria.

Sangatanan (1989) reported that to prevent the deterioration of soil fertility, the introduction of manure such as animal feces and plant litters became a common practice in agriculture. This practice continues up to the present. However, as a result of crop improvement, the amount of nutrients removed by crops becomes larger compared with that of supply of animal feces and plant litters.

The elements plants receive from soil are normally provided by decaying plant and animal matter and dissolved minerals. But sometimes soil does not have enough of these substances, resulting in a need for fertilizer. The harvest of crops, for example, involves removing plants from the soil before they die and decay. The mineral elements contained in the crops do not return to the soil, and so fertilizer must be added to replace the elements. Nitrogen, phosphorous, and potassium are the elements in which soil is most frequently deficient. (World Book Multimedia Encyclopedia, 1996)

Soils high in organic matter can absorb more water than those with less. Increasing the organic through the application of farm manure and other farm refuse and green manuring will therefore help minimize the amount of runoff. Farm refuse should be left in the fields and should not be burned except in the case of crops badly insect pests or diseases. (Highlights 1998).

Liming and fertilizing, plants will not grow well when the soil is poor in fertility or the soil is too acidic. These conditions interfere with the availability of plant nutrients for the growth of both plants and microorganisms. When the soil is favorable to plant growth, plants will grow rapidly. They promptly cover the soil and therefore protect it against severe rainfall. Liming by improving the structure of the soil promotes the percolation of water and minimize runoffs. (Highlights 1991)

Fertilizers and organic fertilizers

Fertilizer is a material that contains elements essential to plant growth and that is added to soils to correct plant nutrient to correct plant nutrient deficiencies. (Collier's Encyclopedia, 1993)

Increase in production resulting from the use of fertilizer probably accounts for about a fourth of all crop production. Without fertilizer, greater amounts of land and labor would be needed to produce the same quantity of food and fiber. With these advantages, fertilizer has been a great need for food production. (World Book Multimedia Encyclopedia, 1996)

Sangatanan (1983) stated that organic fertilizer comes from animal and plant matters such as pig manure, chicken manure, carabao manure, cow manure, horse manure, goat manure, leaves of plants, rice straw, corn stover, rice hull, etc. The use of organic fertilizer results in better soil structure and soils with sufficient amount of organic matter retain more water for plant use.

He also mentioned that organic fertilizer (organic manure) is generally the most valuable soil conditioner. The materials from organic fertilizer generally have

low nitrogen (N), phosphorus (P), and potassium (K) but they also supply other essential micro - nutrients. As soil conditioners, organic fertilizer helps prevent soil erosion, crushing and cracking of soil. They retain soil humidity and improve the internal drainage of the soil.

Sangatanan (1989) added that organic fertilizer can be used in place of chemical fertilizer, such as compost, animal manure, azolla, ipil-ipil, industrial wastes and oil seed meals. Organic fertilizer should serve as a supplement to inorganic fertilizers. It improves the physical make-up of the soil making it porous and rich in organic matter.

CHAPTER III
METHODOLOGY

A. Materials

The materials used in this study were seven sacks of mud slurry, 480 corn seeds, ruler, push-rule, markers, plow, hand trowel, watering cans, sticky tape, cardboard's, weighing scales, test tubes, wash bottle, test tube rack, test tube brush, beakers, stirring rods, containers and droppers.

B. Land preparation

The land was pulverized and plowed to a depth of 4 - 6 centimeters using the animal-drawn plow. Lime was applied to the soil since it was analyzed and the researchers found out that it is acidic. Four rows for each replicate was prepared. Each row was labeled with the number of the replicate and the amount of mud slurry applied.

Seven sacks of mud slurry was taken from Passi Sugar Central. This served as the fertilizer used in conducting the study.

C. Planting procedures

Two kernels of corn was dropped to each hill with a depth of approximately 3 - 5 centimeters at a distance of 30 centimeters apart. Twenty hills were utilized. Mud slurry was applied after fifteen days of planting. For each

replicate four rows contained different amount of mud slurry as applied. The amount used were as follows:

Control	pure garden soil
Treatment 1	750 grams mud slurry applied per hill
Treatment 2	1500 grams mud slurry applied per hill
Treatment 3	3000 grams mud slurry applied per hill

D. Application of mud slurry

Fifteen days after planting the corn, mud slurry was applied. Constant application of mud slurry was done every after fifteen days.

E. Procedures for soil analysis

Soil samples were taken from the research site and brought to the school laboratory. The chemical contents of the soil samples were analyzed. In the calcium test, soil filtrates were prepared by mixing 299 grams soil and 300 ml distilled water. Six clean test tubes were prepared and thirty drops of soil filtrates were added to each test tube. Two drops of 0.1 M ammonium oxalate solution were added to each test tube, except the sixth which served as the control. The test tubes were shaken. The mixtures were held against the light and were compared to the control. The observations and results were tallied on a table.

The phosphorus test was done by preparing the filtrate with the same ration used in the calcium test. Ten drops of the soil filtrate were placed on the

five test tubes. A control of ten drops of distilled water was placed on the sixth test tube. Five drops of 0.1 M ammonium molybdate were added to each test tube and shaken. A pinch of tin was added to each test tube the again it was shaken. The test tubes were examined and the presence yellow colored precipitate was observed. The results were recorded on a table.

The pH test was done by using the pH meter. First the pH meter was calibrated. Using the same filtrate for each soil sample, the pH meter was dipped to the filtrates six times. The results were recorded on a table.

On these following tests, three samples of soil per treatment were used. Therefore a total amount of 36 soil samples was used.

F. Research Design

1. Type of research: Experimental
2. Experimental Unit: Corn
3. Area: Pavia
4. Treatments:

   Independent: Application of mud slurry per hill

   Dependent: Height of corn after 3 months of culture
5. Replication: 3 trials for each independent variables
6. Measurement: Height in centimeters
7. Control: 100% soil

This study is an experimental of type that deals with the effect of mud slurry in the growth of corn plants. The experiment was conducted at Pavia, where the area was located. On the other hand, the analysis of the content of the soil and mud slurry was conducted in the laboratory of Philippine Science High School-WVC. The different treatments of this study are the following:

Independent Variables:	application of mud slurry per hill
Treatment 1	750 grams mud slurry applied per hill
Treatment 2	1500 grams mud slurry applied per hill
Treatment 3	3000 grams mud slurry applied per hill
Control:	pure soil

Dependent Variable: Height of corn plants in centimeters at the range of 3 months of observation

Note: There are three replicates or trials for each independent variable.

G. Statistical Test

All the data to be gathered are to be properly organized and statistically analyzed using one-way ANOVA.

CHAPTER IV

RESULTS

The soil productivity is determined in no small degree by the nature of its subsoil. By proper cultivation and the incorporation of organic residues its physical condition maybe modified.

Philippine soil nowadays, become less and less productive because of lack of nutrients in it. Mostly farmers use commercial fertilizers in order to increase their products and obtain a higher profit. They have noticed that instead of earning a higher profit they have lost a bigger amount. Constant use of inorganic or commercial fertilizer will lead to disastrous results that harden the soil and will lose the capacity to retain moisture.

Due to this circumstances, the researchers first analyze the contents of the soil such as its calcium and phosphorous contents. The results of the analysis are shown in the tables below.

RESULTS FOR THE QUANTITITATIVE ANALYSIS FOR THE SOIL SAMPLES

CALCIUM TEST

Table 1. Result of the calcium test on the soil before planting.

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 2. Result of the calcium test on Control 1.

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 3. Result of the calcium test on Control 2.

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 4. Result of the calcium test on Control 3.

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 5. Result of the calcium test on Treatment 1.

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 6. Result of the calcium test on Treatment 2

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Table 7. Result of the calcium test on Treatment 3

	Sample # 1		Sample 2		Sample 3	
Trial #	Absent	Present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

PHOSPHOROUS TEST

Table 8. Result of the phosphorous test on Control 1.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Table 9. Result of the phosphorous test on Control 2.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Table 10. Result of the phosphorous test on Control 3.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Table 11. Result of the phosphorous test on Treatment 1.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Table 12. Result of the phosphorous test on Treatment 2.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Table 13. Result of the phosphorous test on Treatment 3.

Trial #	Sample 1			Sample 2			Sample 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Legend:

✪ abundant

☆ adequate

❍ absent

pH TEST

Table 14. pH test result before applying lime.

No. of trials	sample #1	Sample #2	sample #3
1	5.99	6.88	6.79
2	6.00	6.84	6.78
3	6.89	6.98	6.77
4	6.29	6.93	6.82
5	6.33	6.87	6.85
6	6.51	6.85	6.80

Table 15. pH test result for Control 1.

No. of trials	sample #1	Sample #2	sample #3
1	7.13	7.20	7.24
2	7.10	7.21	7.15
3	7.06	7.24	7.18
4	7.20	7.29	7.23
5	7.16	7.22	7.20
6	7.02	7.26	7.29

Table 16. pH test result for Control 2.

No. of trials	sample #1	Sample #2	sample #3
1	7.02	7.13	7.21
2	7.05	7.17	7.20
3	7.12	7.15	7.21
4	7.09	7.17	7.19
5	7.13	7.10	7.20
6	7.14	7.12	7.20

Table 17. pH test result for Control 3.

No. of trials	sample #1	sample #2	sample #3
1	6.98	6.82	7.04
2	7.15	6.88	7.24
3	6.95	6.92	7.26
4	7.02	6.87	7.18
5	7.04	6.85	7.15
6	7.00	6.88	7.14

Table 18. pH test result for Treatment 1.

No. of trials	sample #1	sample #2	sample #3
1	6.90	6.99	7.11
2	6.93	7.02	7.07
3	7.03	7.05	7.07
4	6.96	7.02	7.08
5	6.94	7.02	7.04
6	6.95	7.02	7.07

Table 19. pH test result for Treatment 2.

No. of trials	sample #1	sample #2	sample #3
1	6.82	6.98	7.07
2	6.83	6.98	7.06
3	6.93	7.04	7.06
4	6.89	6.90	7.05
5	6.86	6.95	7.06
6	6.88	7.00	7.06

Table 20. pH test result for Treatment 3.

No. of trials	sample #1	sample #2	Sample #3
1	7.00	6.96	7.02
2	6.98	6.99	7.00
3	6.98	6.96	7.03
4	6.99	7.02	7.04
5	6.96	7.01	7.02
6	6.98	6.98	7.03

GROWTH OF CORN

Height of Corn

The study entitled, " Mud Slurry From Sugar Production Used As Fertilizer ", has the primary objective of determining the effect of mud slurry used as a substitute fertilizer on the growth of corn specifically on its height.

Fifteen days after planting the corn, mud slurry was applied. Constant application was done every after fifteen days after the application and the height of the corn within that range was recorded and the tables below show the mean height of the corn from data gathered.

Table 21. Mean height of corn in cm, 15 days after applying mud slurry

Hill	Control	T3	T2	T1
1	40.75	33.19	39.37	32.17
2	38.05	34.60	33.87	36.32
3	44.15	29.41	40.58	33.60
4	40.76	34.88	36.52	32.04
5	35.33	45.17	36.28	36.75
6	38.04	40.53	38.92	36.46
7	45.84	85.98	39.90	37.25
8	41.17	36.41	39.37	34.29
9	40.32	36.60	37.68	33.70
10	36.15	33.33	35.81	33.02
11	36.39	35.37	37.68	38.44
12	37.68	36.94	37.68	33.77
13	38.95	36.41	38.21	31.06
14	35.56	35.14	41.06	36.94
15	3.45	35.56	37.59	37.68
16	32.09	35.53	33.02	30.90
17	41.96	35.56	37.68	38.44
18	37.97	39.71	34.71	35.97
19	40.24	37.25	33.36	33.75
20	41.51	38.28	40.56	38.10
Mean	39.068	36.29	37.49	35.04
ΣX	781.36	725.85	749.85	700.85
N	20	20	20	20
ΣX^2	30721.52	26531.33	28224.16	24676.67
$\Sigma X^2/n$	30526.17	26342.91	28113.75	24559.54

Table 22. Mean height of corn in cm, 30 days after applying mud slurry.

Hill	Control	T3	T2	T1
1	45.66	38.71	46.44	38.77
2	42.77	40.64	39.78	42.73
3	49.19	36.54	47.01	39.31
4	45.26	39.61	44.22	38.81
5	40.63	51.10	43.06	46.50
6	43.88	46.46	45.17	43.10
7	49.75	41.26	46.30	45.67
8	45.55	42.80	43.84	41.38
9	44.12	43.00	44.27	40.75
10	41.65	39.32	44.52	39.76
11	46.15	43.53	45.73	44.73
12	43.00	42.25	46.86	43.57
13	43.85	45.28	44.45	37.93
14	39.75	41.17	48.20	43.03
15	45.78	42.53	43.35	45.26
16	39.24	40.76	40.18	37.47
17	48.20	45.19	44.44	44.71
18	45.00	43.45	40.40	42.91
19	46.19	44.24	42.66	39.72
20	45.93	43.96	43.28	45.33
Mean	40.58	42.59	44.21	42.07
ΣX	811.17	851.8	884.16	841.44
N	20	20	20	20
ΣX^2	39898.2599	3646.28	39186.36	35554.383
$\Sigma X^2/n$	32899.83	36278.16	39086.95	35401.06

Table 23. Mean height of corn in cm, 45 days after applying mud slurry.

Hill	Control	T3	T2	T1
1	118.29	79.13	84.38	73.44
2	99.30	90.89	87.81	71.75
3	92.63	85.68	90.00	69.63
4	99.11	88.77	93.85	84.01
5	98.84	82.59	93.11	81.54
6	115.89	84.59	94.09	77.26
7	101.98	84.63	95.73	86.06
8	107.62	79.04	99.61	86.25
9	104.23	89.32	93.24	94.07
10	108.89	84.37	105.52	91.63
11	122.75	83.42	91.45	98.95
12	106.03	89.58	87.53	94.68
13	118.07	75.69	103.53	94.34
14	120.07	76.81	85.69	92.05
15	109.10	88.06	91.95	89.56
16	117.03	89.97	87.98	91.37
17	107.61	92.33	106.40	88.47
18	125.12	81.74	92.11	99.68
19	109.73	87.52	105.26	95.81
20	108.29	95.17	114.29	99.17
Mean	109.53	85.47	95.18	87.99
ΣX	2190.60	1709.40	1903.60	1759.80
N	20	20	20	20
ΣX^2	241427.28	146610.94	182403.56	156431.40
$\Sigma X^2/n$	239936.42	146102.42	181184.65	154844.80

Table 24. Mean height of corn in cm, 60 days after appying mud slurry.

Hill	Control	T3	T2	T1
1	128.14	85.69	93.46	83.90
2	110.70	99.74	095.15	80.43
3	107.07	94.53	95.31	78.50
4	114.20	93.44	99.96	97.05
5	109.31	89.26	101.83	91.47
6	125.96	91.12	102.85	86.91
7	112.20	91.48	103.97	95.19
8	121.87	87.04	106.56	94.25
9	115.96	99.36	106.24	103.22
10	121.64	96.35	113.39	109.04
11	131.23	92.73	99.21	105.94
12	116.62	97.82	95.30	110.06
13	131.93	86.38	112.49	105.06
14	127.88	85.68	92.84	103.17
15	119.30	95.18	100.38	103.05
16	125.02	97.24	96.70	100.97
17	115.51	98.77	115.86	101.22
18	134.80	89.64	101.38	107.08
19	114.88	97.58	114.10	107.35
20	118.63	112.86	118.93	111.02
Mean	120.14	94.09	103.30	98.74
ΣX	2402.80	1881.8	2066	1974.80
N	20	20	20	20
ΣX^2	289905.66	177863.38	214610.40	196891.00
$\Sigma X^2/n$	288672.39	177058.56	213417.80	194991.75

Table 25. Mean height of corn in cm, 75 days after applying mud slurry.

Hill	Control	T3	T2	T1
1	132.79	88.05	95.67	88.05
2	115.08	82.97	97.37	102.45
3	111.76	82.13	98.21	96.52
4	119.38	100.75	101.61	95.67
5	116.84	94.83	104.14	92.29
6	130.39	89.75	104.15	92.98
7	118.53	99.06	106.68	94.83
8	127.00	98.21	108.37	90.54
9	120.23	107.53	107.53	102.45
10	127.85	111.76	117.69	99.06
11	136.31	112.61	100.75	95.67
12	120.23	117.69	98.21	102.45
13	131.01	109.22	113.45	90.59
14	132.08	107.53	94.83	89.75
15	124.46	108.37	102.96	98.21
16	131.23	105.83	99.06	100.75
17	120.23	104.99	117.69	103.29
18	140.55	114.30	102.45	93.13
19	121.07	110.91	115.99	101.59
20	122.77	115.15	121.07	116.84
Mean	112.49	92.96	95.74	88.26
ΣX	2249.87	1859.28	1914.81	1765.12
N	20	20	20	20
ΣX^2	313285.82	214707.24	224597.53	190408.82
$\Sigma X^2/n$	253095.75	172846.11	183324.87	155782.43

CHAPTER V
SUMMARY, CONCLUSIONS and RECOMMENDATIONS

The study entitled,"Mud Slurry From Sugar Production Used As Fertilizer", was conducted in Pavia at a range of three months, from September 1997 to December 1997. There were three treatments and a control which has three replicates each. The replicated treatments were as follows: Treatment 1, 750 grams of mud slurry per corn hill; treatment 2, 1500 grams of mud slurry to one hill of corn while treatment 3 , 3000 grams of mud slurry was applied to each corn hill. For the control, corn seeds were planted to 100% pure garden soil.

Results of the Study showed that the growth of corn was highly affected by the application of mud slurry. In treatment 1, during the first four weeks after planting, significant effects of mud slurry were observed based on the results. However, on the succeeding weeks up to the last weeks of culture, insignificant results were gathered . On the other hand in treatment 2, based on the results gathered showed the significant effect of mud slurry as a substitute fertilizer from the very start to the end. While the corn plants under treatment 3, directly

influenced by the large amount of mud slurry that the growth stopped which resulted as an insignificant effect.

Based on the results of the study, the researchers recommend that further study be conducted using small proportions of mud slurry. Although the higher proportions are also recommended for further studies, it should be done during the seasons where corn does grow healthy under favorable conditions such as months of April and May when the first rain starts to fall. It is further recommended that the mud slurry to be used is properly dried up for about four weeks before it is to be applied. This is to ensure that the corn production is not infected with fungus brought about by the wet mud slurry.

CHAPTER VI

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APPENDICES

Appendix Table 26. Result of Calcium Test on T1:R1

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	Present	Absent	Present	absent	present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 27. Result of Calcium Test on T1:R2

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	Present	Absent	Present	Absent	present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 28. Result of Calcium Test on T1:R3

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	Present	Absent	Present	Absent	present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 29. Result of Calcium Test on T2:R1

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	Present	Absent	Present	Absent	present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 30. Result of Calcium Test on T2:R2

	Sample # 1		Sample # 2		Sample # 3	
Trial #	Absent	present	Absent	Present	absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 31. Result of Calcium Test on T2:R3

	Sample # 1		Sample # 2		Sample # 3	
Trial #	Absent	Present	Absent	Present	absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 32. Result of Calcium Test on T3:R1

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	present	Absent	Present	absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 33. Result of Calcium Test on T3:R2

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	present	Absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 34. Result of Calcium Test on T3:R3

	Sample # 1		Sample # 2		Sample # 3	
trial #	Absent	present	absent	Present	Absent	Present
1		✓		✓		✓
2		✓		✓		✓
3		✓		✓		✓
4		✓		✓		✓
5		✓		✓		✓
6	✓		✓		✓	

Appendix Table 35. Result of Phosphorous Test on T1:R1

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 36. Result of Phosphorous Test on T1:R2

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 37. Result of Phosphorous Test on T1:R3

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 38. Result of Phosphorous Test on T2:R1

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 39. Result of Phosphorous Test on T2:R2

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 40. Result of Phosphorous Test on T2:R3

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 41. Result of Phosphorous Test on T3:R1

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 42. Result of Phosphorous Test on T3:R2

Trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Appendix Table 43. Result of Phosphorous Test on T3:R3

trial no.	SAMPLE # 1			SAMPLE # 2			SAMPLE # 3		
	✪	☆	❍	✪	☆	❍	✪	☆	❍
1		✓			✓			✓	
2		✓			✓			✓	
3		✓			✓			✓	
4		✓			✓			✓	
5		✓			✓			✓	
6			✓			✓			✓

Legend:

✪ abundant
☆ adequate
❍ absent

Appendix Table 44. Result of pH Test on T1:R1

No. of trials	Sample #1	Sample #2	Sample #3
1	7.14	7.03	7.16
2	7.16	7.09	7.19
3	7.23	7.13	7.15
4	7.18	7.08	7.17
5	7.15	7.06	7.14
6	7.19	7.07	7.16

Appendix Table 45. Result of pH Test on T1:R2

No. of trials	Sample #1	Sample #2	sample #3
1	6.93	7.07	7.16
2	6.95	7.10	7.19
3	7.02	7.14	7.15
4	6.97	7.10	7.17
5	6.94	7.11	7.16
6	6.98	7.12	7.17

Appendix Table 46. Result of pH Test on T1:R3

No. of trials	Sample #1	Sample #2	sample #3
1	6.63	6.87	7.00
2	6.73	6.88	6.83
3	6.85	6.93	6.92
4	6.74	6.89	6.91
5	6.73	6.88	6.84
6	6.67	6.89	6.89

Appendix Table 47. Result of pH Test on T2:R1

No. of trials	Sample #1	Sample #2	sample #3
1	6.73	7.01	7.15
2	6.84	7.06	7.11
3	6.90	7.10	7.16
4	6.82	7.05	7.14
5	6.78	7.04	7.13
6	6.86	7.07	7.15

Appendix Table 48. Result of pH Test on T2:R2

No. of trials	Sample #1	Sample #2	sample #3
1	6.72	6.90	6.99
2	6.84	6.88	7.00
3	6.89	6.96	7.03
4	6.82	6.60	7.01
5	6.79	6.70	7.00
6	6.80	6.88	7.01

Appendix Table 49. Result of pH Test on T2:R3

No. of trials	Sample #1	Sample #2	sample #3
1	7.00	7.04	7.06
2	6.81	7.01	7.08
3	6.99	7.07	7.03
4	7.03	7.04	7.00
5	7.00	7.10	7.05
6	6.99	7.05	7.04

Appendix Table 50. Result of pH Test on T3:R1

No. of trials	Sample #1	Sample #2	sample #3
1	7.19	7.03	7.13
2	7.11	7.00	7.09
3	7.14	7.05	7.10
4	7.16	7.09	7.15
5	7.13	7.10	7.18
6	7.13	7.06	7.15

Appendix Table 51. Result of pH Test on T3:R2

No. of trials	Sample #1	Sample #2	sample #3
1	6.95	7.01	6.99
2	6.98	7.04	7.00
3	6.92	7.01	7.03
4	6.94	7.09	7.05
5	6.93	7.04	7.09
6	6.97	7.03	7.06

Appendix Table 52. Result of pH Test on T3:R3

No. of trials	Sample #1	Sample #2	sample #3
1	6.87	6.85	6.93
2	6.84	6.94	6.90
3	6.88	6.83	6.96
4	6.86	6.87	6.93
5	6.83	6.88	6.80
6	6.85	6.86	6.89

Appendix Table 53. Height of corn, (cm), replicate 1, 15 days after applying Mud Slurry.

Hill #	Control	T3 : R1	T2 : R1	T1 : R1
1	44.45	36.83	39.37	27.94
2	36.83	30.48	33.02	26.67
3	41.9	29.21	36.83	34.54
4	48.26	30.10	40.64	37.85
5	41.91	49.53	39.37	42.67
6	38.10	35.56	38.10	34.29
7	46.99	36.83	40.64	36.83
8	36.83	41.91	33.02	31.75
9	46.99	36.83	34.29	35.05
10	36.83	32.76	35.31	34.29
11	38.1	39.37	36.83	38.35
12	39.37	40.64	38.10	38.1
13	34.29	39.37	39.37	31.75
14	31.75	31.75	40.64	34.29
15	33.20	27.94	43.18	36.83
16	31.75	33.02	35.56	31.75
17	41.91	34.29	34.29	36.83
18	34.29	39.35	35.56	31.75
19	41.91	40.64	33.02	40.39
20	46.99	35.56	38.10	41.91
Mean	39.63	36.50	37.26	35.19

Appendix Table 54. Height of corn, (cm), replicate 2, 15 days after applying Mud Slurry.

Hill #	Control	T3 : R2	T2 : R2	T1 : R2
1	38.43	32.25	36.83	31.75
2	41.76	40.55	33.02	42.67
3	46.99	28.93	42.25	32.76
4	32.10	29.70	36.37	3032
5	31.99	43.32	33.02	34.54
6	37.60	46.65	40.64	38.35
7	43.55	40.64	41.91	34.29
8	47.32	34.24	38.10	31.75
9	38.42	37.40	39.35	33.02
10	33.20	25.32	34.29	36.83
11	39.32	37.53	39.37	42.67
12	31.75	42.25	39.37	34.29
13	48.26	34.29	36.83	31.75
14	39.37	40.64	35.56	34.24
15	40.38	39.37	32.76	31.75
16	32.76	41.81	31.75	26.67
17	40.64	35.56	43.18	40.39
18	45.32	39.15	35.56	35.05
19	35.56	31.75	35.31	27.94
20	43.24	38.64	43.02	31.75
Mean	39.40	36.95	37.45	34.14

Appendix Table 55. Height of corn, (cm), replicate 3, 15 days after applying Mud Slurry.

Hill #	Control	T3 : R3	T2 : R3	T1 : R3
1	39.37	30.48	41.90	36.83
2	35.56	32.76	35.56	39.63
3	43.55	30.10	42.67	33.50
4	41.91	36.83	32.10	27.94
5	32.10	42.67	31.10	33.05
6	38.42	39.37	45.65	36.75
7	46.99	30.48	38.43	40.64
8	39.37	33.02	43.18	39.37
9	35.56	35.56	40.64	33.02
10	38.42	41.91	32.76	27.94
11	31.75	29.21	41.91	34.29
12	41.91	27.94	35.56	28.93
13	34.24	35.56	38.42	29.67
14	35.56	33.02	46.99	42.25
15	41.76	39.37	36.83	44.45
16	31.75	31.75	31.75	34.29
17	43.32	36.83	35.56	38.10
18	34.29	40.64	33.02	41.10
19	43.24	39.35	31.75	32.92
20	34.29	40.54	40.55	40.64
Mean	38.27	35.37	37.77	35.87

Appendix Table 56. Height of corn, (cm), replicate 1, 30 days after applying Mud Slurry.

Hill #	Control	T3 : R1	T2 : R1	T1 : R1
1	49.05	41.91	46.30	33.65
2	39.83	36.25	39.23	35.12
3	45.90	35.09	45.25	39.22
4	52.03	38.10	48.12	44.05
5	44.95	53.23	45.23	48.25
6	43.09	41.62	43.35	39.03
7	50.01	39.99	47.06	47.17
8	40.08	47.81	35.33	39.58
9	49.99	45.62	40.99	42.81
10	40.87	39.25	45.38	40.16
11	43.32	47.81	47.93	45.11
12	42.15	45.18	49.11	43.02
13	40.06	53.04	43.65	38.29
14	35.65	36.00	47.93	41.62
15	42.00	33.82	49.16	44.25
16	40.03	40.29	41.28	38.11
17	47.98	43.24	40.62	43.30
18	45.02	44.07	39.82	39.33
19	44.08	48.32	47.41	47.51
20	50.20	41.43	43.16	58.26
Mean	44.31	42.58	44.32	41.89

Appendix Table 57. Height of corn, (cm), replicate 2, 30 days after applying Mud Slurry.

Hill #	Control	T3 : R2	T2 : R2	T1 : R2
1	45.63	38.21	43.38	39.55
2	47.38	45.41	39.55	47.83
3	53.21	35.16	47.61	38.75
4	38.19	37.63	45.45	39.09
5	39.28	49.25	46.49	45.90
6	45.73	51.10	39.49	43.72
7	48.03	47.30	48.27	41.08
8	52.20	39.02	46.83	39.18
9	43.60	44.09	43.81	40.13
10	38.82	31.46	44.01	44.09
11	46.29	47.91	40.28	47.14
12	37.60	48.35	47.36	39.07
13	52.19	39.30	42.41	38.24
14	42.41	47.46	43.81	38.14
15	46.24	48.20	38.67	40.18
16	39.02	45.57	39.98	33.30
17	46.72	48.45	49.25	45.27
18	52.21	39.41	41.05	42.02
19	42.16	38.73	39.89	32.29
20	48.35	43.06	48.75	39.17
Mean	45.29	43.25	43.84	40.71

Appendix Table 58. Height of corn, (cm), replicate 3, 30 days after applying Mud Slurry.

Hill #	Control	T3 : R3	T2 : R3	T1 : R3
1	44.29	36.02	49.65	43.10
2	41.10	40.25	40.56	45.23
3	48.45	39.37	48.18	39.96
4	45.56	43.10	39.10	33.28
5	37.65	50.83	37.02	45.35
6	42.83	46.67	52.67	46.56
7	51.21	36.48	43.56	48.75
8	44.37	41.56	49.37	45.38
9	38.76	39.29	48.00	39.30
10	45.75	47.24	44.16	35,04
11	38.83	35.37	48.99	41.93
12	49.25	33.21	44.12	38.62
13	39.29	43.50	47.30	37.25
14	41.18	40.05	53.18	49.29
15	49.10	45.56	4225	51.35
16	38.67	36.42	39.28	40.99
17	49.91	43.91	43.46	45.56
18	3775	46.87	41.34	47.37
19	51.32	45.67	40.67	39.35
20	39.24	47.38	47.92	48.55
Mean	43.23	41.94	45.04	43.11

Appendix Table 59. Height of corn, (cm), replicate 1, 45 days after applying Mud Slurry.

Hill #	Control	T3 : R1	T2 : R1	T1 : R1
1	108.03	79.82	81.03	68.68
2	99.75	85.44	88.69	67.77
3	92.18	90.06	103.75	70.93
4	96.56	77.38	77.83	69.12
5	110.22	93.14	65.11	87.78
6	108.68	76.92	75.66	70.91
7	97.64	81.38	99.98	89.33
8	101.78	68.60	111.94	82.28
9	107.59	91.76	93.03	114.38
10	106.68	81.38	105.83	93.96
11	103.64	68.60	97.85	115.75
12	97.68	103.46	95.78	88.81
13	101.20	63.84	93.81	100.11
14	113.25	68.30	76.13	103.00
15	112.35	89.14	88.58	90.38
16	113.98	101.28	79.65	77.97
17	115.72	77.92	98.12	68.61
18	113.35	98.06	105.98	111.35
19	93.93	87.38	97.85	97.16
20	110.65	104.32	112.77	107.20
Mean	105.24	85.39	92.47	88.77

Appendix Table 61. Height of corn, (cm), replicate 3, 45 days after applying Mud Slurry.

Hill #	Control	T3 : R3	T2 : R3	T1 : R3
1	138.30	88.18	93.91	63.28
2	98.76	93.38	84.27	82.28
3	92.98	79.76	76.31	70.11
4	101.56	99.39	103.56	89.65
5	90.29	73.62	111.00	76.63
6	105.30	80.56	108.16	82.98
7	113.25	84.81	85.25	78.19
8	115.11	77.90	87.06	108.35
9	106.22	93.11	95.98	98.60
10	108.60	72.30	103.08	87.23
11	122.28	83.67	93.13	95.25
12	112.94	89.28	74.38	93.50
13	109.00	79.93	123.30	84.30
14	108.46	73.66	92.29	94.27
15	119.38	91.33	79.43	86.16
16	113.72	78.79	75.78	96.12
17	108.30	100.32	115.67	98.68
18	136.35	74.32	96.98	89.91
19	116.87	99.65	120.15	87.27
20	97.30	89.93	131.12	90.56
Mean	110.75	85.19	97.54	87.67

Appendix Table 62. Height of corn, (cm), replicate 1, 60 days after applying Mud Slurry.

Hill #	Control	T3 : R1	T2 : R1	T1 : R1
1	116.83	85.90	90.98	79.98
2	112.31	93.36	97.53	76.35
3	111.46	99.74	106.29	80.60
4	116.84	88.13	83.12	77.44
5	120.16	100.60	72.20	96.75
6	120.83	83.98	83.92	77.41
7	112.06	89.31	108.65	95.20
8	127.11	73.20	118.23	87.84
9	122.30	99.35	110.93	120.28
10	116.25	112.18	114.25	114.74
11	113.23	77.25	104.04	121.38
12	109.38	115.04	103.17	97.60
13	120.61	79.23	103.45	110.06
14	121.28	74.39	85.69	117.83
15	118.12	94.81	96.10	97.14
16	123.16	104.23	88.63	88.37
17	127.11	83.65	106.99	79.99
18	128.56	107.18	113.28	118.33
19	101.20	93.08	103.85	114.19
20	122.29	118.79	114.42	117.22
Mean	118.05	93.82	100.29	98.44

Appendix Table 63. Height of corn, (cm), replicate 2, 60 days after applying Mud Slurry.

Hill #	Control	T3 : R2	T2 : R2	T1 : R2
1	118.36	78.52	89.29	97.38
2	116.94	101.90	97.69	73.06
3	111.12	96.06	96.54	75.23
4	114.38	90.82	105.97	114.84
5	108.32	85.14	113.11	89.52
6	141.83	100.74	102.16	88.82
7	103.62	94.52	112.28	103.30
8	115.35	98.68	107.00	79.60
9	103.38	97.60	100.79	77.14
10	121.22	90.90	110.28	116.22
11	150.06	102.12	90.11	93.36
12	117.19	82.06	96.90	120.29
13	156.12	89.68	102.98	108.27
14	148.27	98.36	92.85	89.33
15	110.41	94.30	118.99	113.74
16	130.42	97.52	118.28	111.28
17	107.11	102.30	117.16	109.46
18	132.76	80.14	87.89	105.15
19	128.16	89.22	104.21	112.31
20	126.16	118.28	103.98	116.77
Mean	123.06	94.44	103.42	99.75

Appendix Table 64. Height of corn, (cm), replicate 3, 60 days after applying Mud Slurry.

Hill #	Control	T3 : R3	T2 : R3	T1 : R3
1	149.23	99.65	100.10	74.33
2	102.85	103.96	90.23	91.88
3	98.62	87.79	83.11	79.69
4	111.38	101.38	110.80	98.88
5	99.46	82.04	120.17	88.14
6	115.22	88.63	122.46	94.49
7	120.92	90.60	90.98	87.06
8	123.16	89.25	94.45	115.31
9	122.19	101.14	107.00	112.25
10	127.46	85.98	115.63	96.16
11	130.41	98.82	103.49	103.07
12	123.29	96.36	85.82	112.29
13	119.06	90.22	131.03	96.84
14	114.10	84.30	99.99	102.34
15	129.38	96.44	86.06	98.28
16	121.30	89.98	83.23	103.26
17	112.30	110.36	123.42	114.22
18	143.07	81.60	102.98	97.76
19	115.28	110.44	134.25	95.54
20	107.45	101.52	138.39	99.06
Mean	115.19	94.02	106.18	98.04

Appendix Table 65. Height of corn, (cm), replicate 1, 75 days after applying Mud Slurry.

Hill #	Control	T3 : R1	T2 : R1	T1 : R1
1	121.72	88.90	93.98	83.82
2	114.30	96.52	99.06	78.74
3	116.84	101.60	109.22	83.82
4	121.92	91.44	83.82	81.28
5	124.46	104.14	76.20	99.06
6	124.46	86.36	86.36	81.28
7	116.84	93.98	111.76	99.06
8	132.08	76.20	119.38	93.98
9	127.00	104.14	111.76	124.46
10	121.92	114.30	119.38	116.84
11	119.38	81.28	104.14	129.54
12	114.30	119.38	106.68	111.76
13	127.00	83.82	104.14	114.30
14	127.00	78.74	88.90	121.92
15	124.46	96.52	99.06	104.14
16	129.54	109.22	91.44	91.44
17	132.08	88.90	109.22	81.28
18	134.62	111.76	114.30	121.92
19	109.22	96.52	106.68	116.84
20	127.00	119.38	116.84	119.38
Mean	123.31	97.16	102.62	102.74

Appendix Table 66. Height of corn, (cm), replicate 2, 75 days after applying Mud Slurry.

Hill #	Control	T3 : R2	T2 : R2	T1 : R2
1	121.72	81.28	92.44	101.60
2	121.72	106.68	99.06	76.20
3	116.80	99.06	99.06	78.74
4	119.38	93.98	106.68	119.38
5	111.76	88.90	114.30	93.98
6	147.32	104.14	104.14	91.44
7	109.22	96.52	114.30	106.68
8	119.38	101.60	109.22	81.28
9	109.22	99.06	101.60	81.28
10	129.54	93.98	114.30	119.38
11	154.94	104.14	91.44	99.06
12	119.38	88.90	99.06	124.46
13	160.02	93.98	104.14	111.76
14	152.40	104.14	93.98	93.98
15	114.94	99.06	121.92	116.84
16	134.62	101.60	119.38	116.84
17	109.22	109.22	119.38	114.30
18	139.70	83.82	88.90	109.22
19	132.08	93.98	106.68	116.84
20	127.87	124.46	104.14	121.92
Mean	127.87	98.43	105.15	103.76

Appendix Table 67. Height of corn, (cm), replicate 3, 75 days after applying Mud Slurry.

Hill #	Control	T3 : R3	T2 : R3	T1 : R3
1	154.94	93.98	101.60	83.82
2	109.22	104.14	93.98	78.74
3	101.60	88.90	86.36	83.82
4	116.84	101.60	114.30	81.28
5	114.30	83.83	121.92	99.06
6	119.38	91.44	124.46	81.28
7	129.54	93.98	93.98	99.06
8	129.54	93.98	96.52	93.98
9	124.46	104.14	109.22	124.46
10	132.08	88.90	119.38	116.84
11	13462	101.60	106.68	129.46
12	127.00	99.06	88.90	111.76
13	127.00	93.98	132.08	114.30
14	116.84	86.36	101.60	121.92
15	134.62	99.06	88.90	104.14
16	129.54	91.44	86.36	91.44
17	119.38	111.76	124.46	81.28
18	147.32	83.82	104.14	121.92
19	119.38	114.30	134.62	116.84
20	109.22	106.68	142.24	119.38
mean	124.84	96.65	108.59	102.74

Plate no. 1: 1st application of mud slurry

Plate no. 2: Measuring the height of corn in control 1 after 15 days of application of mud slurry

Plate no. 3: Plants under control no. 2

Plate no. 4: Plants under Treatment 3: Replicate 1

Plate no. 5: Plants under Treatment 2 : Replicate 1

Plate no. 6: Height of corn after 22 days of applying mud slurry. Plants under Treatment 3 : Replicate 2

Plate no. 7: Height of corn after 22 days of applying mud slurry. Plants under Treatment 3 : Replicate 3

Plate no. 8: Height of corn after 22 days of applying mud slurry. Plants under Treatment 1 : Replicate 1.

Plate no. 9: Plants under Treatment 1 : Replicate 2

Plate no. 10: Plants under Treatment 1 : Replicate 3

Plate no. 11: Plants under Treatment 2 : Replicate 1

Plate no. 12: Plants under Treatment 2 : Replicate 2

Plate no. 13: Plants under Treatment 2 : Replicate 3

Plate no. 14: Plants under Control 1

Plate no. 15: Plants under Control 2

Plate no. 16: Plants under Control 3.

Plates no. 17 & 18: Toddling of the land using an animal-drawn plow.

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Plate no. 19: Applying the mud slurry to Treatment 3 : Replicate 1

Plate no. 20: Sorting the soil samples for the soil analysis

Plate no. 21: The set-up of the chemicals

Plate no. 22: Adding chemicals to the soil filtrates

Plate no. 23: Holding the test tube containing filtrates against the sunlight