

AGRICULTURE IN JAMAICA

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THIRD QUARTERLY REPORT OF THE SHORT TERM
PRODUCTION ORIENTED SORGHUM RESEARCH PROGRAMME
OCTOBER 15, 1981 - JANUARY 14, 1982

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THIRD QUARTERLY REPORT OF THE SHORT TERM
PRODUCTION ORIENTED SORGHUM RESEARCH PROGRAMME
OCTOBER 15, 1981 - JANUARY 14, 1982

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by

CLAUDE GRAND-PIERRE
GRAIN PRODUCTION SPECIALIST

IICA/JAMAICA
JANUARY 1982

THE UNITED STATES OF AMERICA
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1. Introduction

This report is prepared as part of the Agreement on Consulting Services for Agricultural Technical Assistance between the Black River Upper Morass Development Company Limited (BRUMDEC) and the Inter-American Institute for Cooperation on Agriculture (IICA). The period covered by this report is October 15, 1981 to January 14, 1982.

2. Principal Activities

2.1 Corn Experiments

2.1.1 Six (6) experiments were established on two (2) different soil types (Four Paths Sandy Loam No. 204 and Newel Loam No. 67) in order to determine the limiting factors to corn production in the project area, with emphasis placed on experiments identifying critical management factors, and simultaneously detecting factors of production which have the highest impact on lowering the cost/benefit ratio.

2.1.2 On the first site (Four Paths Sandy Loam No. 204) all cultural practices have been executed and data collected. All three experiments have been harvested from December 18 to December 22. Due to planning problems, weeding and insect control were delayed one or two weeks contrary to the specifications and recommendations. On the other hand, these experiments were subject to praedial larceny which obligated an early reaping at about 38% moisture content. More than 380 ears were stolen throughout the experiments, modifying quite significantly the data collected. These data will not be analysed statistically, but will be used as indications for further experiments in the final report.

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2.1.3 On the second site (Newel Loam No. 67) germination was very low. Supplying was done twice in two weeks. After investigations, we identified problem as herbicide toxicity. The fact is this land site, chosen by the counter-part, planted previously in sugar cane and during last three years (1977-1979) KARMEX (Diuron) herbicide which is highly soluble and with limited leaching, had been applied. The young seedlings which emerged were abnormal with narrow leaves, chlorosis and apical burning. The roots were apparently in good condition. The three experiments on this site were lost. No data have been collected.

2.2 Sorghum Experiments

2.2.1 Like the corn, six (6) experiments were established, three of them on the Four Paths Sandy Loam Site and three on the Newel Loam Site. For the same reason as stated above, the sorghum experiments on the Newel Loam Site were lost. On the Sandy Loam, the three sorghum experiments were executed without major problems, except for plant density, insect control and weeding which were inadequate, contrary to the specifications and recommendations.

2.3 Corn Shelling and Sorghum Threshing

These operations were started on December 19, with a lot of problems with adjustments which had to be made to the thresher to avoid cracking and to obtain clean grains. With the Christmas period, work was suspended until January 4. This constraint added to the fact that we were more than six (6) weeks behind schedule as mentioned in our Second Quarterly Report, and has obliged us to

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present at this time, only preliminary results of the experiments. The complete results will be submitted in our final report on April 14, 1982.

3. Legume Experiments

3.1 Establishment of Beans and Peas Experiments on Four Paths Sandy Loam Soil Type

3.1.1 Three beans experiments and two cow peas observation plots were established from January 11 to January 14. The objectives of these experiments are:

- (i) to identify the most critical production factors and to detect factors which have the highest favourable impact on lowering the cost/benefit ratio. It consists of a randomized complete block design having 8 treatments and 4 replications.
- (ii) To compare yield response due to four (4) different sources of fertilizer at two (2) levels of application rate, and to identify significant interactions between fertilizer nutrients. It is a 2^4 factorial with 16 treatments and four (4) replicates.
- (iii) To compare the performance of three (3) commercially available varieties for adaptation. The experimental design is a randomized complete block with 3 varieties and 4 replicates.

3.1.2 It had been planned to establish the same type of experiments on the organic soil (peat) in order to study the potential of these varieties in organic soil.

4. General

- 4.1 In relation to our recommendations submitted in our Second Quarterly Report on October 15, 1981, not much has been done to improve the facilities requested:
- (i) A space to be used as Field Office has been provided, but storage and work shop facilities are still inadequate. Rat damage has caused loss in the experimental materials.
 - (ii) No worker has been appointed on a full-time basis as recommended in order to minimize human errors in the management of the experiments using trained workers.
- 4.2 Implementation and execution of the chronogram of activities have been delayed due to other activities assigned to my counter-part who is not under my control.
- 4.3 Supervision of the amount of work to be done on a basis is inadequate, occasioning constant lateness and cost over-runs on the field work.
- 4.4 Due to the late supply of services for land preparation, experimental materials and lack of implementation of the field work, the legume experiments will not be completed on time and the final report due to be submitted on April 10, 1982 will be incomplete.
- 4.5 The request made on September 9, 1981 by memorandum to my counter-part asking for monthly information on average rainfall and frequency, no. of workers/day/experiment, quantity of materials used per experiment and cost etc. has not been complied with, except for August and September.
- 4.6 Due to the delay in the implementation and execution of the field work, the establishment of the legume experiments is 6 weeks behind schedule.

The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. The second part covers the process of reconciling bank statements with the company's ledger to ensure that all entries are correctly recorded and balanced. The final section provides a summary of the key findings and recommendations for improving the accounting system.

The following table shows the results of the audit for the period from January to December 2023. The total revenue reported was \$1,200,000, with a net profit of \$250,000. There were several instances of missing receipts, particularly in the third and fourth quarters, which have been noted for further investigation.

It is recommended that the company implement a stricter policy regarding the collection and filing of receipts. Additionally, a monthly reconciliation process should be established to identify and correct any discrepancies in the accounts as soon as possible.

The audit also identified areas where the current accounting software could be upgraded to provide more robust reporting and security features. The management team is encouraged to review these options and allocate resources accordingly to enhance the overall financial management of the organization.

In conclusion, the audit has provided a comprehensive overview of the company's financial health and highlighted several areas for improvement. By addressing the identified issues, the company can ensure the accuracy and integrity of its financial records.

5. Technical Package of Practices for Grain/Sorghum Production

In accordance with our terms of reference requiring the Grain Consultant to develop a technical package of practices for implementing on-farm grain cultivation under the conditions of the Project Area, I wish to recommend to BRUMDEC the following production patterns for sorghum, based on the preliminary results presented in the Annex.

5.1 Soil Preparation

Do not over work the soil with tillage operations. Ploughing and one harrowing should be sufficient if properly done. The harrowing should be done across the direction of the rows.

5.2 Fertilizer Application

380 Kg/Ha - sulphate of ammonia 21% as 80 Kg N/Ha
217 Kg/Ha - triple superphosphate 46% as 100 Kg P₂O₅/Ha
68 Kg/Ha - Muriate of Potash 60% as 40 Kg K₂O/Ha

If the compound fertilizer 12-24-12 is available, the fertilizer rate should be 12-24-12 - 378 Kg/Ha + sulphate of ammonia 140 Kg/Ha in side dressing when the plants reach a height of 40-50 cm.

5.3 Planting

Distance between rows : 0.80 m
Number of plants per meter : 7
Seed per hectare : 15 - 17 Kg/Ha

5.4 Weed Control

Apply 2.5 Kg/Ha Gesaprin Combi - 80 (equivalent to 1.0 Kg Atrazine) in 400 lt water/ha immediately after planting.

5.5 Early Stage Insect Control

Insects attacking sorghum at early stages can be controlled by spraying a solution of 20 gm Servin (Carbaryl) 80% WP in 10 lt of water. Ten (10) litres of the mixture is enough

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the document outlines the specific requirements for record-keeping, including the need for clear, legible entries and the requirement to retain records for a minimum of five years. It also discusses the importance of regular audits and the role of internal controls in ensuring the accuracy of the records.

3. The third part of the document provides a detailed description of the record-keeping system, including the types of records that must be maintained and the methods used to collect, store, and retrieve the data. It also discusses the importance of data security and the need to protect the records from unauthorized access or destruction.

4. The fourth part of the document discusses the role of the record-keeping system in the overall financial management process. It highlights the importance of the system in providing accurate and timely information to management and in supporting the organization's strategic objectives.

5. The fifth part of the document provides a summary of the key points discussed in the document and offers recommendations for improving the record-keeping system. It emphasizes the need for ongoing monitoring and evaluation of the system to ensure that it remains effective and efficient.

to spray one row 1,500 m long. If aphids are present, add 15 ml Folidol to the solution. One or occasionally two applications of Sevin 80% WP at 3.5 Kg/Ha may be needed for control of Diabrotica sp, Spodoptera sp. The first one, as soon as the attack is noticed (perhaps 10 - 15 days after the emergence). The second application, if needed, should be made 2 or 3 weeks later.

5.6 Harvesting

Before harvest, make sure that the average moisture content is about 14%.

6. Further Area of Investigation

Based on the preliminary results for this period, areas for future grain/sorghum research-needs of the project should be:

- 6.1 Fertilization: Fertilization rates, method of application
- 6.2 Variety: Comparison trials, screening observation and variety X cultural practices
- 6.3 Population Density: Inter-row spacing
- 6.4 Weed Control: Herbicide Trials
- 6.5 Insect Control: Insecticide Trials

These experiments should be established in mid-March, 1982.

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GRAIN SORGHUM EXPERIMENTS AT BRUMDEC

AUGUST 1981 - DECEMBER 1981

PRELIMINARY RESULTS

1. INTRODUCTION

In order to identify production constraints and to suggest and recommend ways of removing these constraints for implementing on-farm grain cultivation under the conditions of the Project Area, three trials were established during the period August 1981 - December 1981. Emphasis was placed on experiments which would identify critical management factors and detect factors of production which have the highest impact on lowering cost/benefit ratio.

These trials were a part of a short-term agronomic research and testing programme, proposed and aimed at developing in the shortest possible time, improved practices for increasing yields and net income of different cereal crops.

The economical analysis of these experiments will be submitted as soon as the complete statistical analysis and interpretation of the results are completed.

2. TRIALS AND EXPERIMENTAL PROCEDURE

2.1 Relevance of Production Factors

The objectives of this experiment are to identify the most critical production factors and to detect factors of production which have the highest impact on lowering cost/benefit ratio.

The design of the experiment was a randomized complete block having 9 treatments and 4 replications. The plot size was 60 m² with 6 rows. Distance between rows was 1 m and row length was 10 m. The data was collected in the two central rows.

The treatments consisted of withholding a different production factor from a complete set of the basic production

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package (BPP). The BPP consists of: 100 Kg/Ha N + 80 Kg/Ha P_2O_5 + 100 Kg/Ha K_2O + Improved Variety (Pioneer 8225) + 90.000 plants/Ha + 3.5 Kg/Ha Sevin (Carbaryl) + Herbicide (Gesaprim Combi - 80) 1 Kg/Ha a.i.

The treatments were:

1. BPP (all factors applied)
2. BPP-N (no N applied)
3. BPP-P (no P applied)
4. BPP-K (no K applied)
5. BPP + 2 weeding (no herbicide applied)
6. BPP-I (no insecticide applied)
7. BPP-H (no herbicide applied)
8. BPP-D (80.00 plants/Ha)
9. V (variety only)

2.2 Basic Fertilizer Experiment

The objectives of this experiment are to compare the yield response due to three fertilizers at three levels of application, and to identify significant interactions between fertilizer nutrients. It is a 3 x 3 x 3 factorial set out in a randomized complete block design with two replications. There are a total of 27 treatments per replicate. The plot size was 20 m² and the harvested plot was 8 m² consisting of 2 central rows with 1 m between rows and 4 m long. The Pioneer 8244 variety was used.

The three levels of fertilizer were:

- N : 0, 50, 100 Kg N/Ha
P : 0, 50, 100 Kg P_2O_5 /Ha
K : 0, 50, 100 Kg K_2O /Ha

2.3 Variety Trial

The objectives are to compare the performance of three commercially available hybrids for adaptation and further

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recommendation. The experimental design was a randomized complete block with 3 varieties and 4 replicates. The plot size was 50 m² with a harvested plot of 16 m² consisting of 4 central rows with 1 m between rows and 4 m long. The varieties were: Pioneer 8225, Pioneer 8244 and Pioneer 8303.

3. Results

3.1 Relevance of Production Factors

The factors studied and the range of yields for the period grown at Elim, St. Elizabeth (Project Area of BRUMDEC) are shown in Table 1.

Table 1 Grain Sorghum Yields at Elim, St. Elizabeth
August - December 1981

Treatments	12% Moisture Average Yield Kg/Ha	Significant Difference
BPP	3375	a
BPP-K	3293	ab
BPP + 2 weeding	3218	abc
BPP-H	3093	abcd
BPP-D	2856	abcde
BPP-I	2854	abcdef
BPP-N	1906	fg
BPP-P	1687	gh
V	937	h

It appears from these results that the most limiting production factors: Phosphorus and Nitrogen.

3.2 Basic Fertilizer Experiment

The response curves of grain sorghum at three different levels of application are shown in Figure 1. The grain yield increases as the Nitrogen and Phosphorus elements are rising from 0 to 100 Kg/Ha. The yield increase starts low from 0 to 50 Kg/Ha but the increase is greater from 50 Kg/Ha to 100 Kg/Ha

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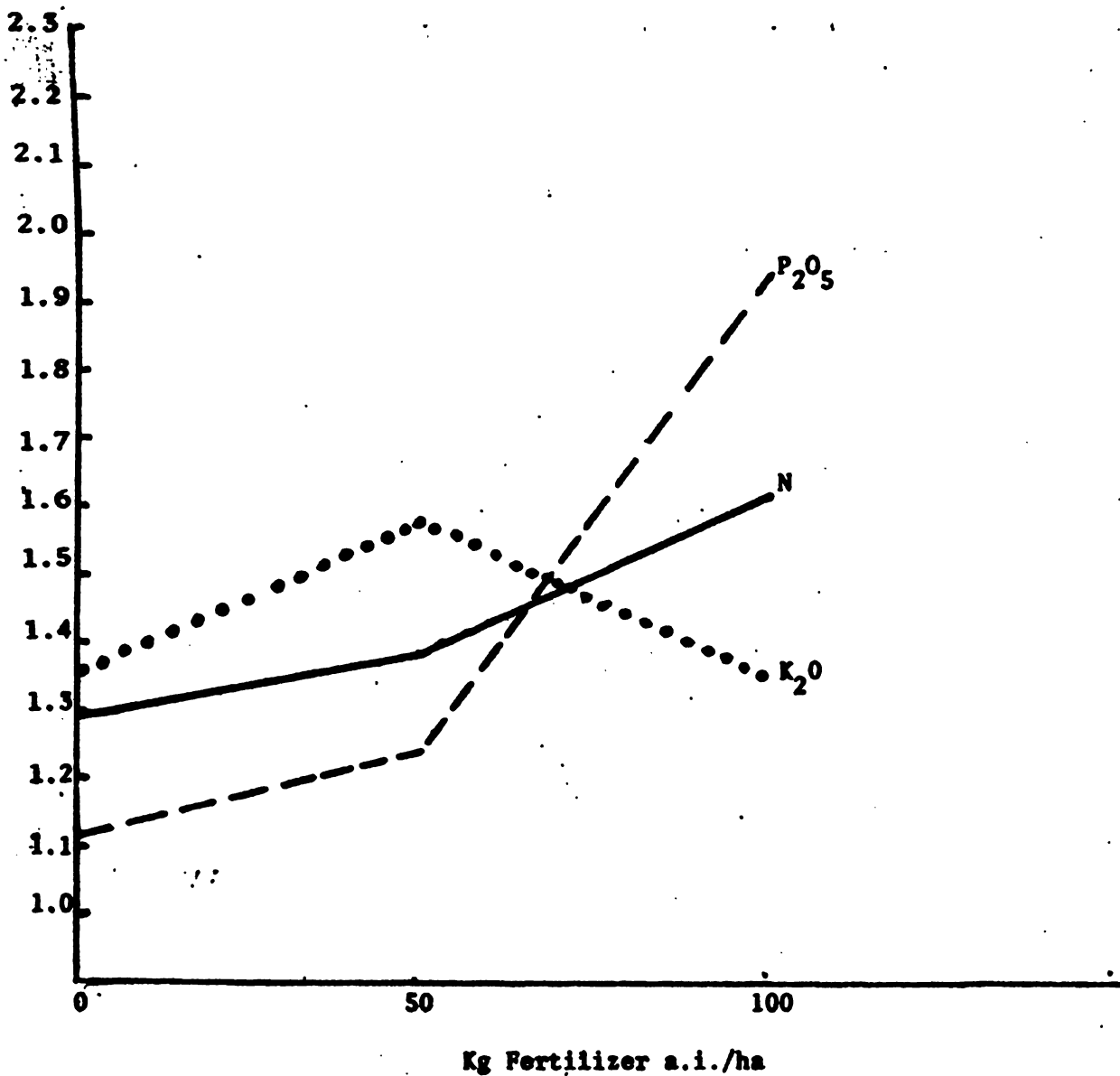
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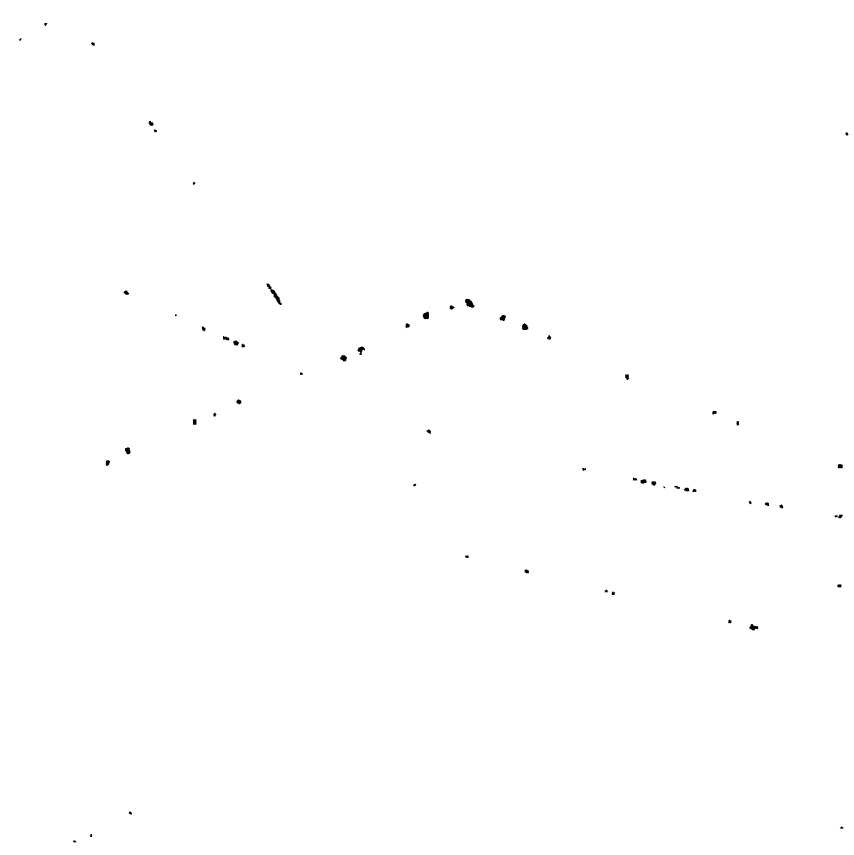
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Figure 1. Response Curves of Grain Sorghum to Three Levels of Fertilizer Application - BRUMDEC August - December 1981





particularly for the Phosphorus and less for the Nitrogen. It means that Phosphorus and Nitrogen are the most limiting production factors under the conditions of the BRUMDEC Project Area for this soil type. On the other hand, Potash application seems to improve yield between 0 Kg/Ha and 50 Kg/Ha, but the yield then decreases between 50 Kg/Ha and 100 Kg/Ha suggesting an interaction effect with the other two elements as shown in Figure 1. Further exploration has to consider fertilization rates between 50 Kg/Ha and 150 Kg/Ha for Nitrogen and Phosphorus and no more than 50 Kg/Ha for Potash.

In Table 2, the average production of dry grain for each Kg/Ha of each fertilizer nutrient is shown. With the first 50 Kg/Ha of N, P_2O_5 and K_2O the responses are: 2.75 Kg/Ha, 3.5 Kg/Ha and 6.25 Kg/Ha respectively.

With the second 50 Kg/Ha, the responses are 6 Kg/Ha and 20 Kg/Ha of grain for Nitrogen and Phosphorus respectively. The average response from 0 Kg/Ha to 100 Kg/Ha of Nitrogen and Phosphorus are respectively 4.6 Kg/Ha and 11.7 Kg/Ha of grain.

Table 2 Average Grain for Each Kg/Ha of Fertilizer Nutrient

<u>Kg/Ha</u>	<u>Kg/Ha</u>	<u>Yield Kg/Ha</u>
<u>1st 50 Kg/Ha</u>	1 N	2.75
	1 P_2O_5	3.50
	1 K_2O	6.25
<u>2nd 50 Kg/Ha</u>	1 N	6.00
	1 P_2O_5	20.00
<u>Total Average</u>	1 N	4.62
	1 P_2O_5	11.75

3.3 Variety Trial

The varieties and the average yields for the period under study at Elim, St. Elizabeth are shown in Table 3.

Table 3 Grain Sorghum Varieties and Average Yields. BRUMDEC Project Area, August - December 1981

Varieties	12% Moisture Yield Kg/Ha
Pioneer 8225	3,937
Pioneer 8303	3,356
Pioneer 8244	3,093

No significant differences in yield have been found between these three varieties. The cultural practices applied to this experiment have been the same as those applied to the Basic Production Package (BPP) used in the first experiment.

4. CONCLUSIONS

After a preliminary analysis of the results submitted and before having a complete interpretation of all the parameters considered in these experiments, some preliminary conclusions can be made in order to provide guidelines for the validation of these results already attained.

4.1 The most limiting production factors for grain sorghum under the conditions of the BRUMDEC Project Area seems to be fertilizer application, particularly Nitrogen and Phosphorus.

4.2 Homogenous population density of plants/meter², regular insect control and good weed control with herbicide will improve the productivity of grain sorghum significantly.

4.3 Fertilizer application at rates of 100 Kg/Ha of N and P₂O₅ and 50 Kg/Ha of K₂O seems adequate for yield over 4000 Kg/Ha under reserve of further investigations on fertilization.

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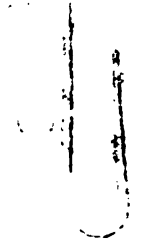
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4.4 Yield response due to increasing application of Nitrogen and Phosphorus up to 100 Kg/Ha N and P_2O_5 have been obtained, while increasing application of Potash above 50 Kg/Ha K_2O shows a decrease in yield.

4.5 The variety to be used is Pioneer 8225 until further experiments can be run for a better selection.



The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that every entry should be supported by a valid receipt or invoice. This ensures that the financial statements are reliable and can be audited without any issues. The second part of the document provides a detailed breakdown of the company's revenue and expenses for the quarter. It shows that the company has achieved a significant increase in sales compared to the previous quarter, which is a positive sign for the business. However, there is also a corresponding increase in expenses, which has resulted in a smaller profit margin than expected. The third part of the document discusses the company's financial position and the steps that will be taken to improve it. It mentions that the company is considering several options, including increasing prices, reducing costs, and seeking new sources of financing. The fourth part of the document provides a summary of the key findings and recommendations. It concludes that the company is on a positive growth trajectory, but it needs to focus on improving its cost management and financial discipline to ensure long-term success.

The document is signed by the Chief Financial Officer, who is responsible for the accuracy and integrity of the financial information presented. It is dated and includes the company's name and contact information for further inquiries.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

2. It is essential to ensure that all entries are supported by proper documentation and receipts.

3. Regular audits should be conducted to verify the accuracy of the records and identify any discrepancies.

4. The second part of the document outlines the procedures for handling cash and credit transactions.

5. All cash receipts should be recorded immediately and deposited in a secure bank account.

6. Credit sales should be recorded at the time of sale, and the amount should be tracked until payment is received.

7. The third part of the document describes the methods for calculating and recording expenses.

8. Expenses should be categorized according to their nature and recorded in the appropriate account.

9. It is important to maintain separate records for each type of expense to facilitate accurate reporting.

10. The fourth part of the document provides guidelines for preparing financial statements.

11. The balance sheet should be prepared at the end of each accounting period.

12. The income statement should be prepared to show the company's profitability over a specific period.

13. The cash flow statement should be prepared to show the company's ability to generate cash.

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1. Introduction
 The purpose of this report is to analyze the impact of the COVID-19 pandemic on the global economy and to propose effective strategies for recovery. The report is structured as follows: Section 2 discusses the economic impact of the pandemic, Section 3 examines the role of government intervention, and Section 4 provides recommendations for a sustainable recovery.

2. Economic Impact
 The COVID-19 pandemic has caused a significant global economic downturn. Key indicators such as GDP growth, employment rates, and consumer spending have all declined sharply. The World Bank estimates that global GDP growth will be negative in 2020, with a projected recovery in 2021. The impact has been particularly severe in emerging markets and developing economies.

3. Government Intervention
 Governments around the world have implemented various measures to mitigate the economic impact of the pandemic. These include fiscal stimulus packages, monetary easing, and social safety nets. While these interventions have helped to stabilize the economy, they have also led to increased government debt and inflation. It is crucial to evaluate the effectiveness of these measures and to explore alternative strategies for recovery.

4. Recommendations
 To achieve a sustainable and inclusive recovery, governments should focus on several key areas:

- Strengthening the financial system: Implementing measures to ensure the stability and resilience of the financial system, including strengthening capital requirements and improving risk management practices.
- Supporting small and medium-sized enterprises (SMEs): Providing targeted support to SMEs, which are a vital part of the economy, through access to credit, technical assistance, and training.
- Investing in infrastructure and human capital: Prioritizing investments in infrastructure, education, and healthcare to create jobs and improve long-term economic growth.
- Enhancing social safety nets: Expanding and strengthening social safety nets to protect vulnerable populations and maintain social stability.

5. Conclusion
 The COVID-19 pandemic has presented a significant challenge to the global economy. While the immediate impact has been severe, there is a path forward. By implementing the recommended strategies, governments can help to stabilize the economy, create jobs, and build a more resilient and inclusive future.

- No. V - 14 Abdul H. Wahab, Percy Aitken-Soux, Irving E. Johnson, Bo-Myeong Woo, Howard Murray and Joseph Dehaney, "Agricultural Production on Hillsides - the Allsides Project Case Study", September 1981
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- No. VI - 3 Claude Grand-Pierre, "Adaptive Research for Grain Production (BRUMDEC) - A Short-Term Programme", January 1982
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1. The first part of the document discusses the importance of maintaining accurate records of all transactions. It emphasizes that this is crucial for the company's financial health and for providing reliable information to stakeholders.

2. The second part of the document outlines the specific procedures for recording transactions. It details the steps from initial entry to final review, ensuring that all necessary information is captured and verified.

3. The third part of the document addresses the role of the accounting department in this process. It highlights the need for clear communication and collaboration between different departments to ensure the accuracy of the data.

4. The fourth part of the document discusses the challenges associated with maintaining accurate records. It identifies common pitfalls and provides strategies to avoid them, such as regular audits and the use of standardized formats.

5. The fifth part of the document concludes by reiterating the importance of this process and encourages all employees to take their responsibilities seriously. It states that the company's success depends on the integrity of its financial records.

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