KWARA STATE POLYTECHNIC, ILORIN

A REPORT ON

STUDENT INDUSTRIAL WORK EXPERIENCE SCHEME (SIWES)

HELD AT:

KWARA STATE MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

By:

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DEDICATION

This report is dedication to Almighty Allah, the giver of life for the privilege given to carry out this SIWES programme.

ACKNOWLEDGEMENT

I take this opportunity to express my profound gratitude and deep regards to the creator of heaven and earth, the one who knows the beginning and the end, the alpha and the omega, the Almighty Allah and also to my parent MR & MRS GBADEGESIN, and to all those who has helped me during my SIWES programme.

I also appreciate my SIWES supervisor assigned to me, Abdulwahab Kazeem, the staffs at Kwara State Ministry of Agriculture and Rural Development, Kwara State. I also take this opportunity to express a deep sense of gratitude to compliment my mentor for his cordial support valuable information and guidance which helped me in completing my SIWES through various stages.

Lastly my deep regard to all hand that contributed toward the completion of this report. . The blessings, help and guidance given by all, time to time has carry me so this far and shall carry on the journey of life on which I am about to embark.. Thank you all.

REPORT OVERVIEW

This report captures the experience gathered during the cause of my Student Industrial Work Experience Scheme, which was carried out at Kwara State Ministry of Agricultural and Rural Development, Kwara State, Nigeria.

The report commence with introduction to what SIWES is and to the various aspect of the activities carried out in the organization where the SIWES is being carried out. The report entails the knowledge gained through practical and theoretical learning.

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CHAPTER ONE

1.1 INTRODUCTION

Student Industrial Work Experience Scheme (SIWES) can be defined as the practical experience of student in order to have quality control and satisfactory performance, when in the field.

SIWES report is the act of writing a detailed analyses and discussion of the activities been carried out in the process of carrying out the SIWES programme

This report is a conscious attempt in partial fulfillment of the requirement for the award of National Diploma in Department of Electrical Engineering. It gives an illustration and enlightenment on how to design an attractive and a presentable graphics and word usage.

Finally, the aims and purposes of written this report is to elicit fully information on what I have been taught and gained at DA HENRYS TECH WORLD as far as the company is concerned.

1.2 OVERVIEW OF STUDENT INDUSTRIAL WORK EXPERIENCE (SIWES)

The students industrial work experience scheme (SIWES) was initiated in 1973 by the Industrial Training Fund (ITF). It is tripartite programmed involving the students, the Universities and Industries. It is funded by the Federal Government of Nigeria and jointly coordinated by the ITF and the National Universities Commission (NUC). It is a skill training program design to expose and prepare students of tertiary institutions for the industrial work situation they are likely to meet after graduation. The scheme also affords the students the opportunity of familiarizing and expose themselves to the needed experience in handling equipment and machinery. The Student Work Experience Scheme (SIWES) program prepares student for labor markets. It has become an innovative phenomenon in human resources development and training in Nigeria. Oyedele (1990) states that work experience is an educational program in which students participate in work activities while attending school. This work experience program gives students the opportunity to be part of an actual work situation outside the classroom. It is designed to expose students to the industrial workplace environment in their respective disciplines during their course of study. The students are also expected develop occupational competencies that would facilitate their fitting into the world of work after graduation. The Students Industrial Work Experience Scheme (SIWES) is a planned and supervised training intervention based on stated and specific learning and career objectives and geared towards developing the occupational competencies of the participants.

Students do not have the practical application of what they were taught in class after graduation and by so doing the ITF in collaboration with the federal government had to introduce Students Industrial Work Experience Scheme (SIWES) so as to help students after graduation.

It was in this view I got to know much of Core Banking System Application and how it works, which is under software development, how I can create USB Window Loader, how I can configure wireless routers which is under networking and how I can design and develop a website.

1.3 AIMS AND OBJECTIVES OF STUDENT INDUSTRIAL WORK EXPERRIENCE SCHEME (SIWES)

The aims and objectives that make all SIWES students both in Universities and Polytechnics to be mandated in partaking in Student Industrial Work Experience Scheme, few are under listed below;

- It exposes students to works' procedures and techniques in handling equipment that may not be available in their institution.
- Provide an avenue for students in institution of higher learning to acquire industrial skills and experience during their course of study.
- Prepare students for the industrial work situation they are likely to meet after graduation. Provide students with opportunity to apply their knowledge in real work situation thereby bridging the gap between theory and practical.

CHAPTER TWO

2.1 BRIEF HISTORICAL BACKGROUND OF THE ORGANIZATION

The establishment at which the SIWES programme is been carried out is the Kwara State Ministry of Agriculture and Rural Development located at Old Jebba road, Ilorin Kwara State.

2.2 OBJECTIVES OF THE ESTABLISHMENT

The aims and objective of the organization is to bring the populace closer to the activities happening around them through the gathering of news report, live broadcasting of news and also to provide entertainment and educate the masses through the media.

2.3 ABOUT AGRICULTURAL AND BIO-ENVIRONMENTAL ENGINEERING TECHNOLOGY

Agricultural and Bio-Engineering Technology is an interdisciplinary field that applies engineering principles to agriculture, biology, and environmental management. It focuses on improving food production, resource conservation, sustainability, and technological innovations to enhance agricultural efficiency. With global challenges such as population growth, climate change, and food security concerns, Agricultural and Bio-Engineering Technology is crucial in developing sustainable solutions that optimize agricultural output while preserving natural resources.

This field combines mechanical, electrical, civil, and environmental engineering with biology and chemistry to develop solutions for modern agricultural challenges. It encompasses a wide range of applications, including precision farming, irrigation and water management, food processing, renewable energy, and automation in agriculture.

Agricultural and Bio-Engineering Technology is an interdisciplinary field that applies engineering principles to agriculture, biology, and environmental systems. It focuses on developing machinery, processes, and technologies that improve agricultural productivity, sustainability, and efficiency

2.4 Key Areas of Agricultural and Bio-Engineering Technology

1. Precision Agriculture

Precision agriculture leverages advanced technologies such as GPS, drones, remote sensing, and artificial intelligence (AI) to optimize crop production and resource management. It enables farmers to make data-driven decisions that improve efficiency and productivity.

Technologies Used in Precision Agriculture

- **Global Positioning System (GPS) & Geographic Information System (GIS)** – Used in tractors and farm equipment for precise field mapping and navigation.
- **Drones & Aerial Imaging** – Monitor crop health, detect diseases, and assess soil conditions.
- **Variable Rate Technology (VRT)** – Enables precise application of fertilizers, pesticides, and water based on soil and crop needs.

- **Automated Soil and Weather Sensors** – Provide real-time data on soil moisture, temperature, and nutrient levels.
- **Machine Learning & AI** – Used in predictive analytics to assess yield potential and recommend farming strategies.

2. Irrigation and Water Management

Efficient water management is essential in modern agriculture, especially with the increasing threat of water scarcity. Bio-engineering and technology have contributed to the development of water-efficient irrigation systems that reduce waste and maximize crop yields.

Advanced Irrigation Systems

- **Drip Irrigation** – Delivers water directly to plant roots, reducing evaporation and water loss.
- **Center Pivot Irrigation** – Uses rotating sprinklers to cover large areas efficiently.
- **Subsurface Irrigation** – Underground pipes deliver water directly to plant roots, conserving moisture.
- **Smart Irrigation Systems** – Use automated sensors and AI to regulate water distribution based on real-time weather and soil conditions.
- **Water Recycling and Filtration Systems** – Convert wastewater into usable irrigation water, reducing reliance on freshwater sources.

3. Food Processing and Storage

Food processing and storage technology is essential in reducing post-harvest losses, improving food safety, and extending the shelf life of agricultural products. Bio-engineering plays a crucial role in designing innovative processing techniques and storage solutions.

Equipment and Techniques Used in Food Processing

- **Grain Dryers** – Reduce moisture content in grains, preventing spoilage and mold growth.
- **Cold Storage and Refrigeration Units** – Preserve perishable foods such as dairy, fruits, and vegetables.
- **Vacuum Packaging Machines** – Extend the shelf life of food by removing oxygen and sealing products.
- **Automated Sorting and Grading Systems** – Use AI and image recognition to classify agricultural products based on quality.
- **Pasteurization and Sterilization Equipment** – Eliminate harmful bacteria from dairy and other perishable foods.

4. Renewable Bioenergy and Waste Management

The integration of bioengineering and agricultural technology has led to the development of sustainable energy solutions derived from agricultural waste. These innovations reduce dependence on fossil fuels and promote environmental sustainability.

Bioenergy Systems and Equipment

- **Biogas Digesters** – Convert organic farm waste into methane gas for energy production.
- **Ethanol Fermentation Plants** – Use crops like corn and sugarcane to produce bioethanol fuel.
- **Biodiesel Production Units** – Convert vegetable oils and animal fats into biodiesel.
- **Pyrolysis Reactors** – Transform agricultural residues into biochar and bio-oil, which can be used as fuel or soil enhancers.

5. Agricultural Machinery and Automation

Mechanization has revolutionized agriculture by reducing labor costs, increasing efficiency, and improving precision in farming operations. Agricultural engineers continuously develop advanced machinery to optimize various farming activities.

Modern Agricultural Machinery

- **Tractors & GPS-Guided Equipment** – Improve efficiency in planting, tilling, and harvesting.
- **Combine Harvesters** – Perform multiple harvesting processes, including cutting, threshing, and winnowing, in a single operation.
- **Seed Drills & Planters** – Ensure uniform seed distribution and spacing for optimal growth.
- **Autonomous Robots & AI-driven Machinery** – Perform tasks such as weeding, harvesting, and sorting crops with minimal human intervention.
- **Smart Greenhouses** – Use climate control, hydroponics, and AI monitoring to maximize crop yields.

6. Bioprocessing and Biotechnology

Bioprocess engineering applies biotechnology principles to improve agricultural productivity, develop bio-based products, and enhance soil health. This field is crucial for developing sustainable farming methods and enhancing food security.

Bioprocessing Technologies

- **Fermenters and Bioreactors** – Facilitate controlled microbial growth for producing biofertilizers, biopesticides, and bio-based chemicals.
- **Genetic Engineering Tools (CRISPR, GMOs)** – Improve crop resistance to pests, diseases, and harsh climatic conditions.

- **Hydroponic & Aeroponic Systems** – Enable soil-less farming through nutrient-rich water or mist-based growing techniques.
- **Micropropagation & Tissue Culture** – Produce disease-resistant and high-yield crop varieties through plant cloning techniques.

2.5 Importance of Agricultural and Bio-Engineering Technology

1. Increased Agricultural Productivity

- Mechanized farming reduces labor dependency and increases efficiency.
- Precision agriculture minimizes waste and optimizes input use.

2. Sustainable Resource Management

- Smart irrigation reduces water consumption.
- Renewable energy solutions decrease dependence on fossil fuels.
- Recycling agricultural waste promotes circular economy practices.

3. Environmental Protection

- Biodegradable fertilizers and pesticides reduce soil and water pollution.
- Renewable bioenergy solutions lower carbon emissions.
- Sustainable land management techniques prevent soil erosion and degradation.

4. Economic Growth and Job Creation

- The expansion of agri-tech industries provides employment opportunities.
- Efficient farming reduces costs and increases profitability for farmers.
- Improved food processing leads to better market access and exports.

5. Food Security and Safety

- Reduced post-harvest losses ensure a steady food supply.
- Advanced processing techniques improve food quality and extend shelf life.
- Biotechnology enhances crop resilience to climate change and diseases.

CHAPTER THREE

3.1 BASIC EQUIPMENT USED IN THE FARM

1. Tractors

- **Purpose:** Tractors are incredibly versatile and are used for many tasks on the farm, from plowing fields to hauling equipment or crops.
    - **Compact Tractors:** Smaller, ideal for smaller farms or specialized tasks like mowing or landscaping.
    - **Utility Tractors:** Mid-sized, often used for general fieldwork and some lifting.
    - **Row-Crop Tractors:** Designed for row-based crops like corn or soybeans; they're higher clearance and can be adjusted for different row widths.

Figure 1:Tractor

2. Plough

- **Purpose:** Plough are used to break up soil, turn it over, and create a fresh layer for planting.
    - **Moldboard Plough:** These have curved blades that flip soil to help with aeration and control weeds.
    - **Chisel Plough:** A more modern approach to tilling, it disturbs the soil less than a moldboard plow, preserving soil structure.
    - **Disc Plough:** Better suited for tougher soil or land with a lot of residue. They use flat discs to slice through the soil.

Figure 2: Plough

3. Harvesters

- **Purpose:** Harvesters are used to collect crops once they're ready. Different types of harvesters are used for specific crops.
    - **Combine Harvesters:** These are large machines that harvest a variety of crops (like wheat, barley, and soybeans). They cut, thresh, and clean the crop all in one.
    - **Cotton Harvesters:** Specifically designed for cotton picking, they either strip or pick cotton from plants.
    - **Forage Harvesters:** These are used for cutting forage crops (like alfalfa or silage), chopping them into small pieces, and collecting them for storage.

Figure 3: Harvester

4. Seeders and Planters

- **Purpose:** These machines help plant seeds evenly and at the proper depth in the soil.
    - **Air Seeders:** Use air pressure to place seeds evenly across a wide area. These are commonly used in large-scale operations.
    - **Planters:** They plant seeds at precise intervals and depths, often with adjustable settings for different crops.
    - **Drills:** They open furrows, drop the seeds, and close the furrow all in one go, typically used for cereals and legumes.

Figure 4: Planter

5. Sprayers

- **Purpose:** Sprayers are used to apply pesticides, herbicides, and fertilizers to crops.
    - **Boom Sprayers:** These are typically mounted on a tractor and have long booms that spray liquids across wide areas.

- **Field Sprayers:** Smaller sprayers for specific applications, like spot treatment or smaller farms.
- **Aerial Sprayers:** Used in large operations, often planes or drones are used to spray crops from above.

Figure 5: Sprayer

6. Balers

- **Purpose:** Balers are used to collect and compress hay, straw, or other forage into compact bales for easy handling and storage.
  - **Round Balers:** Create round bales, which are more common and easier to handle in fields.
  - **Square Balers:** Produce rectangular bales, which are more commonly used in barns or for storage purposes.

Figure 6: Baler

7. Mowers and Cutters

- **Purpose:** Used for cutting grass, hay, or other crops.
  - **Rotary Mowers:** Used for cutting grass and other vegetation; they have rotating blades.
  - **Sickle Mowers:** Used to cut taller vegetation, especially crops like hay or small grain plants.
  - **Disc Mowers:** These are used for cutting hay and other crops and can handle thicker, denser vegetation than a rotary mower.

Figure 2: Mower

8. Cultivators

- **Purpose:** Cultivators help prepare the soil before planting, control weeds, and help aerate the soil.
    - **Tine Cultivators:** Use rotating tines to break up soil and control weeds.
    - **Shank Cultivators:** Have larger, sturdier shanks for deeper soil penetration.

Figure 8: Cultivator

CHAPTER FOUR

4.1 Clear discussion on actual work carried out in the establishment

As an agricultural engineering student training in connection with the Ministry of Agriculture has the opportunity to gain a broad and diverse range of knowledge, skills, and experience that align with current trends and needs in the agricultural sector. This exposure offers a combination of theoretical learning, practical fieldwork, and collaboration with experts, making the student more well-rounded and prepared for a successful career in agricultural engineering.

In the establishment, several activities were carried out from which will be out listed as follows; I was introduced to the organization purpose such as, the organogram of farmland and the basis of engineering with clear information on the reason why we are in the establishment. I was introduced to the farm tools and equipment such as the tractors and every other equipment and gadget that can be attached to the tractor for farm usage. I was able to operate the tractor and being taught how to operate it such as using it for lifting and load of implements.

I also was exposed to the notion that the Ministry provides knowledge on agricultural regulations, including those related to land use, water resources, environmental protection, and food safety and to government initiatives aimed at improving the agricultural sector, such as subsidy programs, research funding, or development projects which also make me learn about national and regional agricultural policies that influence agricultural production, land management, and environmental sustainability

During the programme I and my colleagues were taken to the Agro Processing Centre and were shown some machine used in the production of rice. Also I was introduced to drought resisting crops such as sweet potatoes, cassava and guinea corn.

I was also taught on how to prepare land for irrigation and drainage at which I did alternative practical to confirm the understanding. Also, I participated on survey on how to know the level of the sloppy site of an area with the use of leveling compass at which we did practical on it. We also discussed the about soil management, soil layers and the top soil of land.

I also learnt about combined harvesting which is integral machine used for harvesting and processing maize with various crops that is can harvest such as wheat, maize, sorghum, sun flour etc. I also learnt about the objectives and challenges of post-harvest and also the machine involved such as threshing machine, yam flour machine, etc. I was also taught and shown various farming equipment such as, disc plough, disc harrow and ridger which is used for tillage in the farmland. I also was taken through the functions of this equipment and also the importance of tillage on the farmland including the various types of tillage operation.

I was made to understand the funding mechanisms available for agricultural projects, including grants, loans, and subsidies designed to help farmers and agricultural entrepreneurs succeed. As a student I learn how the Ministry fosters partnerships between government and private stakeholders in agricultural development, including investment in infrastructure, technology, and innovation.

I was taught on maintenance to be put in place for ware-house, the environment of warehouse and it components and functions, the danger and safety in silo with its precaution signs, the various chemical used in cleaning the silo which is unique and known as Tempo. I also learnt about the use of boom sprayer, the function s and how it is been used for spraying.

I was taken to the workshop where I learnt about the SLAM (Sanitation- Aeration- Loading-Monitoring) Welding Silo. I also learnt about how to create the bill of engineering measurement for projects. I participated in any exercise on how to change the bearings of gang of disc. In the establishment, I was shown the different types of clamps, keys, clutches and also how to diagnose engine noise such as piston ring noise, piston pin noise, valve train noise and so on. I also learnt about the drudgery and weed control of pre-planting operation with the instrument that can be used to apply liquid chemical or herbicides to farmland. I also learnt about the Insect Damage Kernel (IDK), Broken Kernel (BK) and also with Insect Pest Identification such as lesser grain borers, rice weevil, cowpea weevil, booklice beetle etc.

I was however taught about the irrigation projects which the Ministry often manages and learn about efficient irrigation techniques, such as drip irrigation, sprinkler systems, and water resource management. I also gain insights into sustainable farming practices promoted by the Ministry, such as conservation tillage, organic farming, and integrated pest management.

Lastly, as a student I learn about the Ministry's efforts in promoting agricultural mechanization to reduce labor costs, increase productivity, and modernize farming practices through understanding how the Ministry supports the development of post-harvest technology to reduce food loss, enhance food storage, and improve food processing techniques.

CHAPTER FIVE

5.1 SUMMARY

This report was carried out in partial fulfillment of the requirement for the award of National Diploma in Kwara State Polytechnic. This report gives enlightenment of various aspect of Agricultural and Bio-Engineering Technology related to the Ministry of Agriculture in Kwara State. in summary, the activities I went through re-shaped my understanding and helped me understand more about mass media.

5.2 CONCLUSION

The training programme which I went through at the establishment enlightens me to aspect of Agricultural Engineering. Agricultural and Bio-Engineering Technology is transforming the agricultural sector by integrating engineering innovations with biological sciences. Through precision farming, mechanization, irrigation management, food processing, renewable energy, and biotechnology, this field ensures that food production remains sustainable, efficient, and environmentally friendly. This has broadened my knowledge but also provide me with an experience of how to handle.

It was in the training I was exposed to a typical industrial atmosphere of learning which has contributed immensely to uplift in my academic and logical approach to educational worlds in general. The important aspect of this training cannot be over or under emphasized as it does not only broaden my knowledge but also make the experience a part of me.

5.3 RECOMMENDATIONS

The recommendations arising from the foregoing appraisal of the effectiveness of SIWES in the formation of competent and productive technical manpower for the economy are summarized as follow.

1. The establishment of a National Commission for Student Industrial Training or a National Board for Cooperative Education was proposed to oversee the implementation of SIWES at the national level.
2. Funds earmarked for SIWES should be appropriated directly by the National Assembly in the same way as for the National Youth Service Corps scheme in order to remove the bottlenecks associated with release of funds for the operation of the scheme.
3. The Federal Government should make adequate provisions in the annual budget for proper funding of SIWES in view of the potentials of the scheme to contribute to enhancing the quality of the pool of technical skills available to the economy.
4. The stipulation that employers should accept students for SIWES should be strengthened with stiffer penalties put in place for defaulters.