Mathematics In Farming: A Cylindrical Based Irrigation Water System in Bakasuo & Ayeotis Farm

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Abstract

The paper "Mathematics in Farming: A cylindrical based irrigation water system in Bakasuo and Ayeotis farm" is discussing the mathematical involvement in the planting of irrigation water system in Bakasuo and Ayeotis farm. The mapping out of spaces for the irrigational water system in the farm and the accessories needed in the construction are also discussed.

Key Words: *Cylindrical pipe, Irrigation water System, Farm, Mathematics*

Introduction

In contribution to knowledge, Schleicher (2023) informed that the world no longer pays for what you know but for what you can do with what you know. Mathematical concepts in agriculture is something farmers have known but they have being paid because they hare not put it into use in their farm land. Farming as a productive skill none appliance of mathematical concepts in it will lead to low productivity. Most farmers are not aware that from getting the land to clearing, planting, weeding, harvesting and selling of produce, involve mathematical concepts usage. This fact is corroborated by Falmata (2023) that says the role of mathematics in agriculture is not limited to soil analysis, calculation of various fertilizer contents, conversion from metric to SI units in foreign markets, evaluation of retail performance, application rates and finance decision making but many more. Joe (2011) also informed, based strongly on Egyptian historical Mathematics tools that most of their mathematics was derived from or inspired by solving agricultural problems, such as calculating areas, volumes, calendars, seed-to-area ratios, and workers-to-area ratios. In support of the fact, BVS Team (2021). states that farmers used mathematical skills and science in their day to day farm activities such as to estimate the seed amount needed, the cost to plant their crop based on the area of cultivated land they possess, to purchase equipment or tools needed and make

payments for various purchases, to determine the amount of tax that needs to be paid, to track the weight of cattle, the milk the cows produces and the crop yield per season. But in Nigerian and most other African farm lands, farmers are less committed with the use of these mathematical concepts in their farms.

Among these mathematical concepts, there is an area which is still not felt in Nigerian agriculture, mostly in the Southern part of the country and that is Irrigation Agriculture. Yes, there are water, water everywhere but it does not solve the agricultural problem during dry season. Its absent contributed into the non-annual production of food in Nigerian and some parts of Africa. Joseph and Molly (2022) in agreement with the fact opined that while the land was good for growing crops, crops also needed water, which the Nile provided and this had led to the Ancient Egyptians constructing a large canal system to trap the water to create a sort of lake as it flows from the Southern to Northern land. This enabled the Ancient Egyptians to grow their crops and rear their animal non-seasonally.

In corroborating the view Google (2023) sees Irrigation as an artificial application of water to the soil through various systems of tube, pumps, and sprays. It is usually used in areas where rainfall is irregular or dry lands or drought is experienced. Jones (2023) equally sees irrigation agriculture as an artificial application of water in the land; he further added that the land requires water before its possible use for any agricultural production. Alabi (2020), equally states that the process of supplying water to crops using artificial channel is known as irrigation. He said all living things need water to survive but the required quantity varies from one body mass to the other. He went further to explain the water content in the plants and compared same with that of humans mathematically. He said plant is made up of 90% of water while human is 70%. This goes further to mean that plants need more water to survive than humans.

The *Irrigation Water System (TIWS): the conceptual view*

Google (2023) highlights 8 types of irrigation and these are surface, localized, drip, sprinkler, centre pivot, lateral move, sub and manual irrigations. Among these types of irrigation that suits the local farmer is the localized irrigation and that is what the paper intends to discuss in the author's perception. And the details are stated below.

Materials Required: Drum, Pipes, elbows, gum, joints, t-joints, regulators, fire materials and sharp-tiny-Iron water pump, bore hole.

Measurement Required: Hundred metres pipes for the farm length and ten metres between the beds where the vegetables or crops are to be planted.

The Conceptual View: Below is the outlook of the irrigation system in discussion. This will enable the local farmer to water his /her farm during dry season in the southern part of Nigeria or any other country that has similar weather condition with the southern part of Nigeria.

The Mechanism: Holes are put into the pipes and are connected to each other and fixed into the drum with stoppers. The pipes are thereafter laid across the farmland using the mathematical dimensions measured out. The formation of the pipes is in the form of a Chained-Half-Closed-Rectangle as shown below.
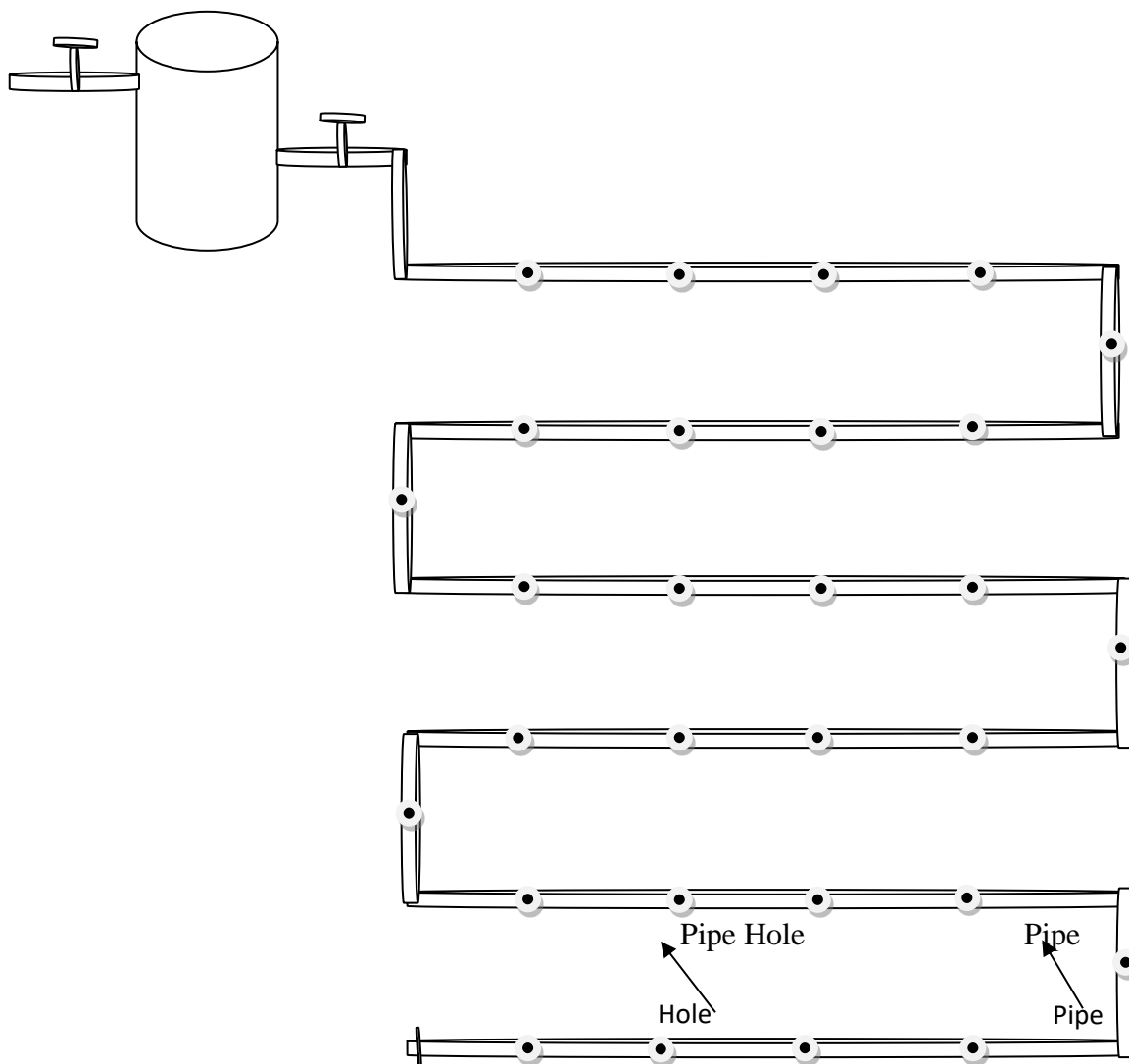
Pipe Hole

Hole

Pipe

Pipe

Fig !: Connected Pipes fixed to the Drum

Here the crops are planted between the pipes with a distance of 2.5m dimension. This distance will enable the workers to go in and weed the grasses and as well harvest the crops when matured.
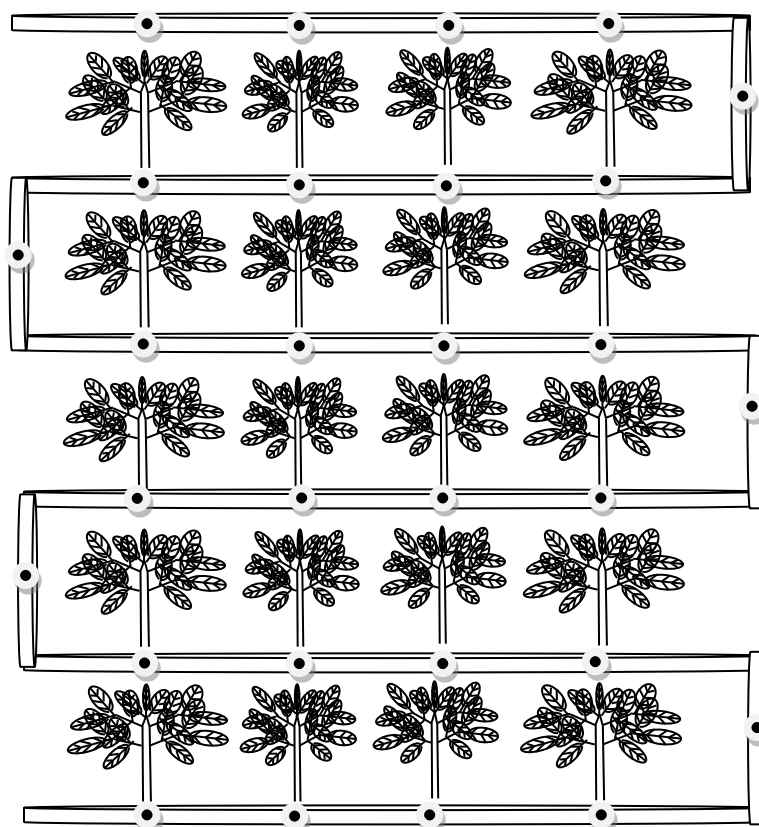
Fig 2: *TIWS* **position in the farm**

The drum is finally connected to the bore hole through a water pump machine. Anytime the water is to be supplied the security man starts the machine. And as the water runs through the pipes the water splashes come out through the holes bore on the pipes, showing triangular rays of water.
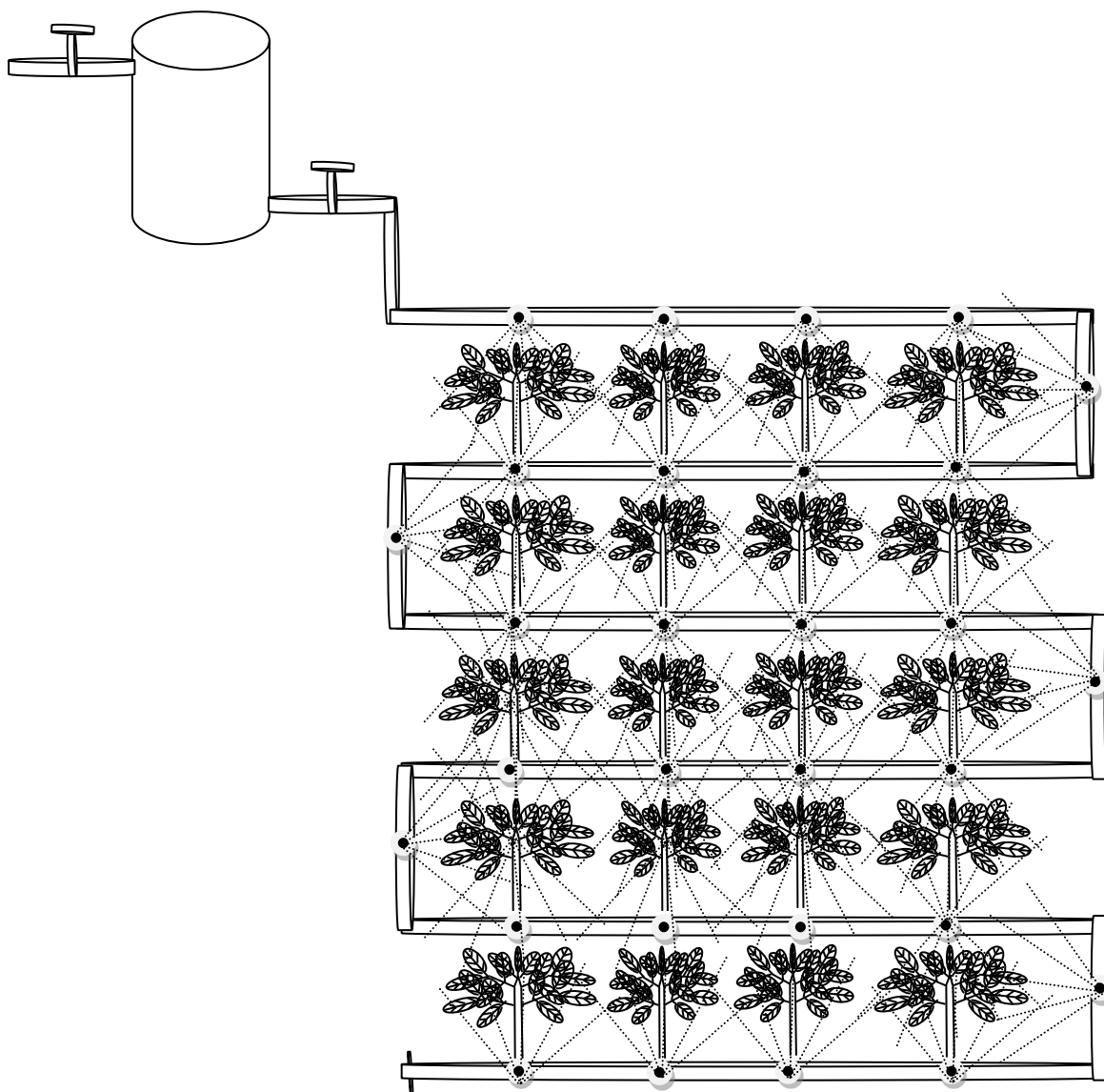
Fig 3: *TIWS* **Splashes Water on the Plants**

The Localized Irrigation constructed here is such that when taps are opened each plant has a direct supply of water from the system. This takes a period of 5 to 10 munities water supply in morning, afternoon and evening hours.

Recommendations: For the purpose of non-seasonal farming in the Southern part of Nigeria the Rectangular-Pipi-Irrigation-System should be used in our farms. Secondly **e**ven distribution is necessary in all human activities, farm irrigation is inclusive. Farmers using this irrigation system should be mindful of even distribution of water supply within the farm land so that all plants benefit evenly from the supply made through the pipe holes.

Conclusion: Mathematics is an integral part of farming, right from time immemorial, but the emphasis was always on putting the seed or seedling on the soil, without given proper consideration to mathematical concepts. This leads to misuse of land space, reduction of seeds or seedlings suppose to be planted which eventually results to reduction of expected production, restriction of free movement in the farm as there are no *measured* (marked) out walk-ways. As BVS Team (2021) indicates that farmers should use mathematics and science in their day-to-day farm activities such as estimating the seeds, amount needed, the cost to plant their crops based on the areas of cultivated land and the rest of them; let our always use the Mathematical concepts in our farm to get maximum yield and gains.

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