

# **MATHEMATICS FOR AGRICULTURAL DEVELOPMENT: A KEY FOR PEACEFUL CO-EXISTENCE**

By

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## **Abstract**

*Mathematics is a subject with a difference for the fact that it cuts across all of disciplines. It has become an essential tool for agriculture since there are many areas in agriculture where mathematical skills are vital. Agriculture is one of the primary sources of wealth which leads to peaceful co-existence among societies and nations. Based on these facts, the paper discussed on the meaning of mathematics, agriculture, peace, the importance of mathematics, the benefits of agricultural education to the society, the role of mathematics in the development of agriculture, conclusion and some recommendations are made.*

**Key words:** Mathematics, Agric, Peace, Development.

According to oxford advanced learners' dictionary (8<sup>th</sup> Edition, 2010) Mathematics is the abstract science of numbers and shapes. Mathematics is a subject with a difference. This is true because it cuts across every discipline. Mathematics is needed by the trader, carpenter, tailor, farmer, engineer, medical doctor just to mention a few. The neglect of Mathematics by any individual will lead to failure, and disappointment. Based on its importance, the examination bodies have deemed it fit to make the subject compulsory for all students/candidates at different levels of education. These examination bodies include Junior School Certificate Examination (JSCE) Board, West African Examinations Council (WAEC), National Examination Council (NECO),

National Business and Technical Examination Board (NABTEB) and Joint Admission and **Matriculation** Board (JAMB).

## **Agriculture**

According to Onazi (2013) Agriculture is rightly regarded as the oldest human occupation and its development is inextricably tied with the social and economic evolution of man. Managing a field or a fishing ground, so as to gain reasonable harvest while minimizing economic and environmental cost has been the oldest form of resource management since the time of creation. Agriculture is also regarded as the life blood of a nation's domestic economy and the mother of all businesses, occupation and professions. Agriculture has continued to shape man's social and economic history.

Agriculture as reported by national planning commission (2004) Agriculture is Nigeria's second source of national wealth. Prior to the discovery of oil, agriculture has been a major sector of the nation's economy. Agriculture as many scholars have come to agree, provides food for man, feed for animals, raw materials for the industries and consequently provides employment and income thereby reducing poverty which most times is a source of conflict and improving economic empowerment of the people which is the path to peaceful coexistence. Agriculture according to several researches has been found to be an antidote to environmentally induced conflict and by extension a source of peace especially among rural dwellers. This paper focuses on the role agricultural education plays in bringing peace through mathematics.

## **Peace**

Abdulkadir and Zanna (2013) in Oxford dictionary (1998) defined peace as quietness, tranquility, mental calm, serenity, freedom from war and freedom from civil disorders. Peace can be defined as a political condition that ensures justice and stability through formal and informal practices and norms.

Peace un-doubtably carries a positive connotation; almost nobody admits to opposing peace; world peace is widely seen as one of the noblest goals of humanity. Various groups however, differ shapely about what peace entails, how best to achieve it, and even if peace is truly possible, peace is an important element in harmonious and comfortable living in any society, race or organization. Peace forms the basis of all types of development either human, social, economic, technological etc (Onazi (2007)

## **The Importance of Mathematics**

The importance of mathematics is known to all and sundry, creative and being recognized globally. Its importance cannot be over emphasized.

Mathematics is important in the development of modern sciences. It is believed that mathematics is the mother of modern science. The basics developed in mathematics such as equations, laws and logarithms are used implicitly in other sciences. For example, the development of algorithms in mathematics will affect the future of

### *Falmata Alhaji Zanna*

computer science since ninety percent of the computer science theories and programming structures are based on abstract algorithms. Another example is related to the medical field where according to the Ourant Institute, New York University, equations that describe cardiac mechanics including blood, muscle, and valve mechanics and electrophysiology are different, in both cases a realistic treatment demands the use of methods that account for anisotropy, in homogeneity, and complex geometries” which are fields in abstract mathematics.

Mathematics is important because of its everyday use in real life by everyone. Since the early ages the basic arithmetic operations had been used by humans regarding his/her origin, culture and language. These four operations consist of the elementary parts of mathematics. Cooking, for instance, is a simple task done by anybody; however, the quality of cooking is based on the amount of ingredients used. People use mathematics to weigh the quantity used through adding and subtracting using balance and units like kilogram and litre. Another good example of the importance of mathematics in daily life is managing how the money grows and how to keep it from shrinking. The simple arithmetic operations (plus and minus) are used for the calculation of the income from a savings account or the charges accumulated on a credit card and these operations could mean big pay offs over time. For thousands of years mathematics has been in use daily in trading or in kitchen while cooking.

Another reason why the study of mathematics is important is that mathematics is the only mutual language used by all human beings regardless of their origin, gender, religion, or culture. One plus one is still equal to two despite of what country it is used in or what language it is expressed with. Adding the cost of the shopping items is the same whether it is in dollars, Euros, or dirham or naira. Few are the people that can speak more than one tongue (language), however, all of us possess the ability to be literate in the mutual language of mathematics.

Mathematics connects people with other cultures in order to communicate and transfer the understanding of strange phenomena. Mathematics is more than just the science of numbers taught by teachers in schools to pupils/students that could enjoy or fear it. It has a significant role in the lives of individuals and society in general. Mathematics theories are used everyday either by experts in applied science like physicians or by chefs in cheap restaurants. It needs to be amplified in education to provide students with skills required to achieve higher education career aspirations and reaching personal fulfillment.

### **Benefits of Agricultural Education to the Society**

According to Onazi (2013) in Abdu (2007) Vocational agricultural education reduces school dropout rate by providing training opportunities for persons who are not satisfied with other forms of education that are distinct from the realities of the world of work. Persons who would have become otherwise compelled to either receive forms of education which do not bring the best in them or drop out and become liabilities to the

nation and agents of destruction of lives and properties are provided with alternatives which suit their interest and ability.

Vocational agricultural education reduces the rate of unemployment in the society. In Nigeria where rate of unemployment is high, vocational agricultural education could be employed to develop saleable skills in youths so that they can become easily employable, thus helping to reduce redundancy with consequences of high crime rate and other social vices that have eaten deep into the fabrics of nations. Vocational agricultural education is also capable of stimulating rapid industrial development in the agro-allied sector by producing workers who are capable of utilizing modern methods of agricultural production thereby increasing the supply of raw materials to the industries. The number and quality of trained technical and professional manpower in agriculture could be said to be most reliable vehicle to economic prosperity, political and diplomatic supremacy of a nation over others, achieved through ensuring a sound national food security which is fundamental for political and economic stability of any nation (Food and Agricultural Organization) (FAO, 1990).

Basic agricultural education can improve significantly the efficiency of training of agricultural extension workers which in turn will affect agricultural production through:

- a. Enhancing the productivity of inputs including labour.
- b. Reducing the cost of acquiring and using information about production technology that can increase productive efficiency.
- c. Facilitating entrepreneurship and responses to changing market conditions and technological developments (Abdu, 2007)

### **Role of Mathematics in the Development of Agriculture**

Agriculture cannot be practiced without mathematics. This is because mathematics plays a vital role towards the development of agriculture.

The areas in agriculture where mathematical skill is vital include:

- i. Soil analysis
- ii. Calculation of various fertilizer contents
- iii. Conversion to/from metric to SI units when dealing with foreign market
- iv. Evaluation of retailer performance
- v. Application rates
- vi. Finance decision

### **Soil Analysis**

Mathematical skill is needed in soil analysis to assist the agriculturalist in the:

- a. Calculation of existing amount of soil nutrient
- b. Calculation of amount of soil nutrient to be added to the soil

*Falmata Alhaji Zanna*

### **Calculation of Various Fertilizer Content**

- a. Mathematical skills will assist the agriculturist in taking the NPK 15:15:15 fertilizer case study
- b. Mathematical skills are required for breaking down fertilizer blends

### **Conversion to/from Metric when dealing With Foreign Market**

In the foreign market, mathematical skills are required in conversions such as:

- a. From naira to dollar
- b. From gallons to liters

### **Evaluation of Retailer Performance**

Mathematics plays a role in investments and advertisement, calculation of revenues generated and investments made as percentage of sales.

### **Application Rates**

Mathematical skills required to calculate the rate of application of fertilizer to avoid error. It will enable the agriculturist to calculate the nozzle size needed, the amount of pressure, the flow rate and quantity of water needed.

### **Finance Decision**

Mathematics skills will assist the agriculturist in the evaluation of investment in trucks, storage tanks and manufacturing.

### **Conclusion**

In conclusion, we have seen the meaning of mathematics, agriculture, peace, the importance of mathematics, and the benefits of agriculture to the society and agriculture for peace keeping and lastly we discussed on the role of mathematics towards agriculture which proved very necessary for any national development.

### **Recommendations**

Based on the discussions made, the following recommendations are proffered:

- i. For Nigeria as a nation to develop, the study of mathematics has to be reinforced by mathematics teachers and the government.
- ii. Mathematics teachers of primary schools, secondary schools and tertiary institution should work harder to carry out effective teaching of the subject.
- iii. Government should motivate the pupils/students in the learning of mathematics by providing mathematics instructional materials, such materials include; textbooks, writing materials and Information and Communication Technology (ICT) tools (projectors, computers) etc.
- iv. The government should motivate mathematics teachers by paying their salary when due, effecting their promotion when due, organize seminars and

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- workshops for mathematics teachers on a regular basis and pay additional incentives to assist teachers in the rural areas.
- v. The government should establish more agricultural schools in addition to the existing ones in the country to boost agriculture all over the nation to supplement the oil economy.

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