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308 Lasani Town, Sargodha Road, Faisalabad - Pakistan
Mob: +92 300 3008585, Fax: +92 41 8815544
E-mail: editorijps@gmail.com

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Indigenous Technology and Agricultural Production: The Case of Poultry Incubator

Stephen J. Ibitoye
Department of Agricultural Economics and Extension, Kogi State University, Anyigba, Nigeria

Abstract: Most poultry equipments available in Nigeria are imported and the expensive nature of these equipment, the difficulties encountered in purchasing them, coupled with the problem of lack of fund has made large-scale production of poultry very difficult in Nigeria. This paper therefore, discusses the concept of indigenous technology and the relevance of indigenous technology to the economy of Nigeria. The paper further highlighted the food production problems in the country and finally explained the construction of poultry incubator using indigenous knowledge with the aid of local materials.

Key words: Technology, indigenous technology, agricultural production, food security, poultry incubator

INTRODUCTION

Labe (2008) defined technology as all the modifications humans have made in the natural environment for their own purposes. Technology can be most broadly defined as the entities created by the application of mental and physical effort in order to achieve some value (Lewis, 2000). In this usage, technology refers to tools and machines that may be used to solve real-world problems. It is a far-reaching term that may include simple tools such as a crowbar or wooden spoon or more complex machines such as a space station or particle accelerator.

According to Rowell (2002) technology can also be used to refer to a collection of techniques. In this context it is the current state of humanity's knowledge of how to combine resources to produce desired products to solve problems, fulfill needs or satisfy wants. It include technical methods, skills, processes, techniques, tools and raw materials.

Similarly, Ngoka (1992) regard indigenous technology as technologies employed by the native inhabitants of a country and which constitute an important part of its cultural heritage and should therefore be protected against exploitation by industrialized countries. Indigenous technology according to Enukora (1990) is a set of processes, methods, techniques, skills and the characteristic products existing and developed around specific condition of populations. These form the basis for local – level decision making in agriculture, health care, food preparation, education, natural resource management and a host of other activities in rural communities. These could have been developed through interaction with other culture or exclusively by the initiative of the Nigerian people.

History of early development has been centered on the development of tools for agriculture. It is the development of agriculture that has made it possible for man to live in settled communities which developed from families, villages and grew in complexity to cities and the modern nations.

Agricultural tools have developed from stone to the automatic tractors, equipment and agricultural airplanes and each step forward in the development was associated with some definite technological innovation, resulting in better ways of carrying out farming operations.

In the last 30 years in many African Countries, there exists an abiding awareness for more technological input into farming. Governmental policies usually encourage the introduction of machines and their wide spread usage in agricultural operations. Over the short span of 30 years, all forms of mechanization ranging from the giant bulldozer for land preparation to self propelling combine harvester are available. All these machines and equipment are imported into the country and their performances have been a mixture of success and failure and the ultimate objective of getting sufficient food to the table is far from being realized.

The relevance of indigenous technology: Akinyemi (1989) asserted that the basic components of any country's knowledge system encompasses the skills, experiences and insights of people applied to maintain or improve their livelihood. Thus country's ability to build and mobilize knowledge is essential for sustainable development.

Dayanatha (2006) identified five major characteristics of indigenous technology thus: they are generally low capital intensive and since they are usually environment and ecology friendly, they are also sustainable. Thirdly, they are generally location and site specific and have limited adaptability, they also diffuse over small homogenous zones mainly by farmers to farmers interaction and finally, that they generate only small increments in output. Indigenous technology have historically made and will continue to make a valuable contribution to world of science and technology and cultural heritage.

According to Labe (2008), indigenous technology are an important resource not only for the communities who developed it but also for the scientist and technologist, since they have the potential to promote social and economic development by improving the understanding of the local conditions.

Labe (2008) further stressed that indigenous technology provide alternative to western know-how, thereby giving more options for solving problems. Indigenous technology has been shown to harbour many benefits for the communities, which have developed them. For examples, indigenous technology give rise to local industrial investments that are less capital intensive thereby yielding the much desired multiplier effects such as employment generation, rural economic empowerment and lessened dependence on imports.

Further more, most times indigenous technology are part of the lives of the rural poor; their livelihood depends almost entirely on specific skills and knowledge essential for their survival. Besides, it needs to be remembered that the modern technologies that now pervade every facet of world human activities started as indigenous technologies in the country of their origin. For these reasons and more, indigenous technologies needs to be preserved, protected, researched and promoted.

Food security situation in Nigeria: Food security is the access of the population of a country to enough food for an active and healthy life all the year round (Ugbomeh, 1994). Idachaba (1991) asserted that a nation experiences food insecurity when no measures are taken to cushion the effects of production and price variation on consumption. Infact food production variations have always been the causes of food insecurity in many developing countries like Nigeria. This situation of food insecurity can also be attributed to the low current growth rates of crop and livestock production of one percent and 0.75% respectively, which are insufficient to cope with the higher over all demand growing at 3.5% per annum (Oyewole, 2009). As a result, the gap between demand and supply has continued to widen as production of food fail to meet the demand both in quantity and quality.

Agriculture has suffered from years of mismanagement, inconsistent and poorly conceived government policies and the lack of basic infrastructure. Agriculture has failed to keep pace with Nigeria's rapid population growth, so that the country which once exported food, now relies on import to sustain itself.

Ikpi and Olayemi (1995) further stated that between 1988 and 1990 per capital food production in Nigeria remain virtually stagnant, suggesting that the food security situation in the country is still a matter of concern, because a nation that cannot feed her citizens cannot have national stability and economic development.

Nevertheless, traditional agriculture still remain the major avenue of expanded food production in Nigeria today. Idachaba (1991) reported that small farms ranging from 0.01 to 5.99 hectares constitute about 80 percent of the farm holding in the country and contribute about 98% of the food produced in this nation. There is no doubt that lack of capital and technical know-how impose serious limitations on the level of traditional farming system.

Ikpi and Olayemi (1995) asserted that Nigeria who was once the biggest poultry producer in Africa has had the corporate poultry output been slashed from 40 million birds annually to about 18 million. Import constraints limit the availability of many agricultural and food processing inputs for poultry and other sectors. The design of an incubator for local use at this crucial time of our food crisis is timely and appropriate.

The poultry incubator

Materials used for the construction: For the purpose of constructing the incubator, the following materials were used. Plywood of different measures, 2.5 x 2.5 cm wood, empty cartons, kerosene lamp, electrical appliances such as bulbs, cables, adaptor, plastic water container, thermometer, bedding materials such as cotton wool or soft cloth, nails, fertilized eggs, sac materials, polish, paint and chemicals such as formalin and potassium permanganate.

Methods of construction: The size of the incubator depends on the interest of the constructor.

For an incubator of 69 cm by 45 cm. about 240 cm x 90 cm plywood was used. The 24 cm edge was sawed to four (4) pieces, while the 90 cm edge was sawed to two (2) pieces. Also, the 2.5 x 2.5 cm wood was sawed in the same dimension which serve as the frame.

Nail the 2.5 x 2.5 cm wood together to form a frame in which the carton and the plywood will be nailed (Fig. 1). First lie the frame with carton so as to retain heat for the hatchery. Then nail the flat wood of various sizes to the frame to form a box.

Do not cover a face of one 45 cm by 45 cm side, of the incubator. That will serve as a door.

Cut off a space of 30 cm by 15 cm for the glass that will be fixed for the door. Then nail the door to the appropriate place in the box. Having nailed the plywood to the frame, drill a hole at the center of the top flat wood for the thermometer. At one side of 60 cm by 45 cm drill seven holes of 0.25 cm diameter for proper ventilation. Make another two holes at the two edges of the opposite side for the electrical appliances. Each hole is to house a 60 watts bulb.

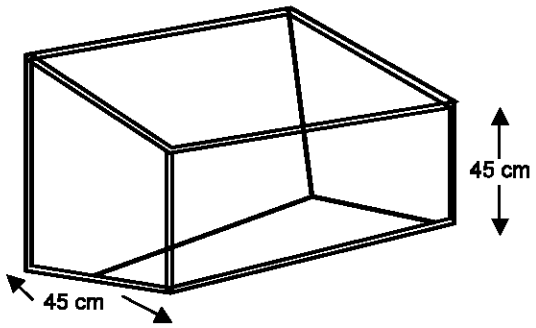

Fig. 1: Incubator frame

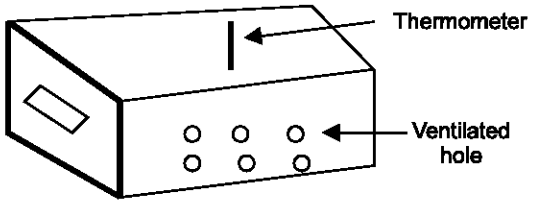

Fig. 2: Completed incubator

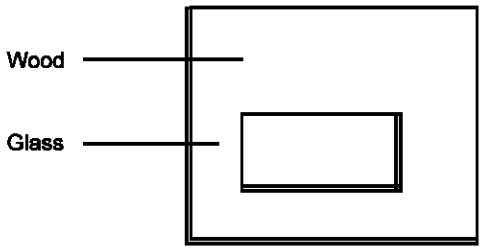

Fig. 3: Construction of door frame

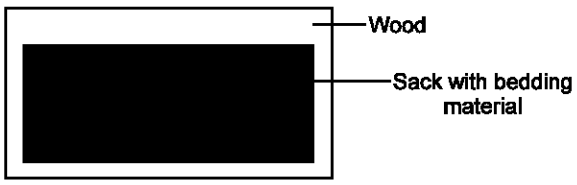

Fig. 4: Construction of egg tray

The egg tray will be placed to about 15 cm to the top flat wood. Two bulbs of 60 watts each were suspended into the incubator with the aid of electric cable and the lamp holder. In the absence of electricity, kerosene lantern can be used. The use of thermometer is to read the level of hotness of the incubator and to make sure that the temperature in the incubator is kept between 37.0°C and 38.0°C. A plastic container was used in placing water in the incubator to regulate the humidity. The source of the heat (electric bulb or kerosene lamp) is placed bellow the egg tray. Turning of eggs will be done with hand at regular intervals.

This model is capable of hatching about 50 eggs at a time, bigger model can accommodate up to 100 eggs at a time. The model is an improvement over natural incubator. A matured hen can only hatch about 15 eggs at a time. The hen will also have more time to lay eggs. When tested the incubator recorded about 70% success. However, the incubator unlike the imported ones, is faced with the problems of crudeness, low degree of accuracy and not lasting long.

Conclusion: Increasing food production in Nigeria is the only antidote to the persistent food crisis in this country. Nigerian governments have experimented on intensifying cultivation in an already cultivated land as well as expanding the existing land into hitherto uncultivated land. However, the two have failed to bring out the much needed positive results.

The traditional method of farming using traditional tools must be replaced by modern scientifically based technological method. To succeed, the small-scale farmers must be developed through rural awareness, financial empowerment, education and participation in specific areas of interest.

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