CONTROLLING EROSION THROUGH INDIGENOUS TECHNOLOGY: IMPLICATION FOR SCIENCE EDUCATION IN NIGERIA

Mrs Esther Ezigbo Odigwe

Abstract

In Nigeria, indigenous technologies have been neglected because of the glamour for modern science and technology. Modern machinery and techniques have been exported to Nigeria and other developing countries from the developed countries without taking into cognizance the different socio-economic background. Therefore it is suggested that Nigeria must be more self-reliant in indigenous technology, which requires national measures to ensure that it is directed towards the welfare of the people vis-a-vis erosion control.

Introduction

A close review of human history shows that science and technology, whether in pre-historic rudimentary forms, or in this modern day sophisticated and complex forms, have continued to keep pace with the challenges and evergrowing complexities so far associated with mankind.

However during the last hundred years or so, science and technology have radically changed our ways of life, new methods of industrial productions have given an increasing flow of consumer goods and new life style, new forms of transportation and communication have changed work patterns and relationship, medical science has almost eliminated the old diseases such as tuberculosis and increased life expectancy amongst others.

Against this background therefore, it is quite helpful to focus on the need for indigenous technology to man's life situations and moreso, to our own experience here in Nigeria. For a full appreciation of the subject, we may perhaps reflect First on the nature of technology following which we will be better placed to consider their needs., values and uses.

Hence from primitive era, through middle age, into modern times, technology has kept pace with man and has helped in no small measure in providing solutions to the problems of mankind all over the globe.

Nature of Technology

The Oxford Advanced Learner's Dictionary (2000) defined technology as the mastery and utilization of scientific knowledge, particularly the systematic application of knowledge to practical ways in industry. Hence it is pertinent to note that the growth of industries and quasi-industrial establishments has fostered significantly. The emergence and diversification of technology in may countries.

With the exposition made about the definition and nature of technology, it becomes necessary to explain the meaning of technology. It would be seen as the education given to an individual, to enable him get into the operational system of the universe, either as a body of knowledge or as an inquiry with practical applications.

It is therefore in the nature of technology to evolve new skills, new tools, new techniques and methods for translating scientific ideas into practical realities. In doing so, originality and motivation are of prime importance.

Hence we note that effective and lasting technology can only be derived from the ingenuity of people, based on a determination to face practical challenges, and to find solutions to them in their own way. To this extent, therefore, it is certainly an altruism to assert that technology may not be readily transferred; rather it evolves in its own way among the people or culture.

The Big Neglect

It is not often that science and Technology are properly used for the common good. In fact there are numerous incidents showing that science and technology wonders have turned out to be nightmarish blunders. It is not surprising that many now question whether science and technology can provide the key that will unlock the solutions to the problems of abject poverty, environmental destruction, famine, social injustice, and other problems plaguing societies in Nigeria and other Third World Countries.

Then, the big question is what has Nigeria and indeed Africa achieved during the past decade of intensive application of modern science and technology? What can the country achieve through the building of indigenous capacity and through the appropriate use of political power? Should the underdevelopment of African continent be attributed to the features of science and technology perse or to the wrong use of political power. For the leaders of the new nation states in Africa, science and technology were and still are perceived as a new source of natural power, and instrument capable of enhancing their political base within the society. Unfortunately such attention implied that the rush for exogenous (modern) technology by African leaders was motivated from the perspective of the pursuit of individual political power under the pretext of national security. Science and technology from the very beginning were not seen as instrument for solving existing social economic inequalities in the society.

Above all, this optimistic but naive concept of development as a linear and sequential process

had dominated the application of science and technology in the process of socio-economic transformation in Africa. It has led to the rejection of traditional technology and cultural value perspective in the process of development, the alienation of traditional technology and cultural values subject the continent to greater dependency and exploitation, which explains why African countries are under-developed and why the benefits of modern science and technology have not had trickle- down effect on the vast majority of the people.

Failure of Science and Technology

The failure of science and technology in Africa and Nigeria in particular can be attributed to the quick rush for the linear sequential concept of development. Secondly, is the belief that high technology offers the best solution to under-development since modern technology has the characteristics of:

Being highly mechanized,
Large production units,
Capital intensiveness,

In conjunction with this technological hardware, there is also the need for technological software, in terms of technological capacity know-how, high administration competence, and high innovation capacity. All these features arc lacking in Africa.

Local Technology for Self-Reliance

Indigenous technology has just the opposite characteristics of modern technology:
It is man-power intensive
Low energy consumption
Small scale production units
Less capital intensive

Unfortunately, sufficient attention was not focused on these essential available factors, especially using abundant manpower resources to increase agricultural productivity and to improve the quality of life.

Indigenous technology in the view of Obiakor (1988) is synonymous with the term "appropriate technology", the philosophy of which was propagated by a London-based groups of persons (called The Appropriate Technology Unit) in the 1970s. The Chairman/Head of the group Dr. E.F. Shumanchc published a book in 1973 titled "Small is Beautiful". The book explained the objectives of his group and generated a lot of world-wide interest, especially among developing nations and international Aid Agencies. Among other things, the book concluded that:

> Since poverty is the major problem in the underdeveloped countries, its solution lies in the choice and application of technologies which would increase productivity and result in the rural and urban communities preserving the environment as well. International aids would not solve the problem because they are usually geared towards economic infrastructures in the urban areas.

> Appropriate technologies for the under-developed countries are likely to be those between the inefficient traditional technologies and the large scale capital intensive industries of the advance nation. An important feature of appropriate technologies is that they meet local needs and use local resources, they are cheap and small in scale, thus they encourage the distribution of small capital investment in the rural urban areas, use of local skills and raw materials, reducing reliance on imported "Factors of production''.

The book was received with mixed feelings in many countries. China, Indonesia, Korea, Taiwan, Singapore and Japan used the philosophy to increase their industrialization and agriculture.

Unfortunately, some politicians and fighters-for-independence in the developing nations termed it as yet another method by the "White man" to keep down the developing countries. Hence, they complained bitterly against adopting the philosophy. Other countries like Nigeria which thought that the philosophy should be tried whenever possible changed the terminology to indigenous Technology. To cater for the effect of Structural Adjustment Programme (SAP), Nigeria now adds the phrase, for self-reliance. Thus we-speak of Indigenous technology for self-reliance.

However, technology is a distinct factor in the development process which must be studied, developed and sustained for self-reliant economy. Technology involves subjective and controversial factors to a large degree. Technology contains embodied values, history and experience of the nation that develops it as the nation grapples to satisfy societal needs within the context of available resources including local environmental circumstances. That is why nations that import turnkey technology may in time become turnkey states with turnkey culture.

Capacity to generate technology change is a crucial clement in the development process. Technology is know -how or in flic full sense or the art of doing, not for their own sake but for specific utilization ends and purposes. To develop suitable, adequate and appropriate technology is a complex

project encompassing among other filings the environment, ecological, cultural and economic studies and should be based on the analysis of historical trends and changes. Science like religion, left to itself is harmless. But its importance lies not so much in the study but its uses. Science is the business of nations and governments. In U.S.A., for instance, the security agencies especially the Federal Bureau of Intelligence (FBI) and Central Intelligence Agency (CIA) commit men and fund to watch and guard against the theft or illegal use of the country's technology, even the relationship between US and Japan did not prevent FBI from arresting Japanese agents for attempting to buy the technology secrets of America several years ago.

The case with Nigeria has been guided by inappropriate policy and technology application, opting for everything western and modern; this implies a white elephant in a traditional technological landscape, [everything is imported' machines, equipment, spare parts, experts and administrative capability. Take for instance Taiwan, which started in their technology only in 1973. Today everything now in Nigeria is made in Taiwan. So, that is the more reason why local technology will be encouraged.

Appropriate Policy and Technology

The amount of effort and capital invested in appropriate policy, strategies and technology acquisition, if invested in appropriate policy approaches and indigenous technology would have better effect with long-term socio-economic benefits for all in the society. Some of these benefits would include:

Proper utilization of capital
Better transitional effect
Less dependency on outside economic trends
Less unemployment
Balance or fair distribution of purchasing power

Appropriate policy and technology implies the development of traditional technology with great emphasis on developing domestic capacity and capability rather than depending on exogenous know-how and capital. An essential criterion is to take advantage of the wide spectrum of technological know-how offered from traditional technology to advanced electronic competence.

Foreign experts have knowledge only of tire techniques that are used back-home and nothing of traditional technologies existing here in Nigeria. Thus it is necessary that, history and revitalization of traditional technology should be included in the educational curriculum. This is one essential aspect of history that has been neglected. Also the secondary school science curriculum has to be restructured in line with the new national policy on education.

Also the objective of secondary school science education should be relevant to the nature of learners. The assertion is true since the achievement of the objective entails, asking meaningful questions, observations, exploration, experimentation and verification of facts, assumptions, recording, preservation and dissemination of information. These activities and process go a long way to contain the ever curious, probing, never resting and interactive tendencies of the people of the secondary school age.

Recommendations

It is hoped that the following recommendations if adhered to by all stakeholders will help in promoting traditional science and technology in Nigeria

(1) Introduction of history and revitalization of traditional science and technology in the educational curriculum at all levels
(2) The secondary school science curriculum should be restructured in line with the new national policy on education
(3) There should be review and subsequent enforcement of policies and laws governing the conservation, utilization and management of natural resources in Nigeria
(4) Workshop and seminar should be organized to create awareness on the importance of traditional science and technology
(5) It is recommended that ministries of technology be established at the state level to help harness resources and build the necessary environment for the growth of traditional science and technology
(6) Government should provide adequate fund for the development of traditional science and technology

Conclusion

The establishment of Ministries of Technology at the state level should be encouraged. These ministries when established, in co-operation with the Federal Ministry of science and Technology will help harness resources, and build the necessary environment for the growth of science and technology. Nigeria has a rich past, and science and technology constitute the missing link in its quest for greatness in the years ahead. It is our collective responsibility to help remove this obstacle. It is the only way out for our success in indigenous technology; we cannot fail.

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