

THE IMPACT OF SCIENCE AND TECHNOLOGY ON POVERTY ALLEVIATION

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Abstract

Nigeria like every other developing country requires the contributions of science and technology in solving her national issues. Everywhere across Nigeria, the stark realities stare us in the face: poverty, hunger, degradation, squalor, unemployment, crime, social ills and vices and untimely death. In this paper, science and technology were seen as the force that helps to alleviate poverty issue in Nigeria. The paper also identified the people referred to as poor in the society, outlined some of their characteristics and the causes of poverty. This paper also highlighted the problems facing science and technology in trying to alleviate poverty in the society. Moreso, some recommendations were given.

Introduction

The persistence of poverty in virtually all the cities of the world remains one of the most pressing social issues confronting urban governance in the world today. This, however, explains why an increasing academic discourse is directed at the issue of poverty. Despite the many countries by scientific and technological advances and the globalization of product and finance, neither government, nor the private sector have found the key to eradicating persistent poverty that grips a majority of human kind (Ayandele, 2004). Nigeria's quest to achieve its national objectives of achieving "a great and self reliant economy" will only be an illusion unless the government and stakeholders in the educational sector of the nation realize, with great urgency, the fundamental place of compulsory science and technology education in the school system.

It is commonplace nowadays to talk of contemporary periods as the age of science and technology (Okoye, 1999). They are used to harness the forces of nature and to transform the raw resources with which nature endows man into goods and services for better quality of life. Indeed, the wealth, influence and power in the world political scene of any nation depend on her capacity and capability to utilize science and technology for socio-economic development. Any nation that wishes to remain stable and self-perpetuating must strive to raise the standard of living of the people through the employment of certain scientific and technological advances that tend to maximize the exploitation of ail available resources. This calls for skilled manpower that can only be developed through science and technology education.

With the increase in government expenditure on research and development, both directly and through contract with industry and the universities in the developed countries, it has been found necessary to. establish national science and technology policies. The national objectives are as follows:

- (i) Increasing public awareness in science and technology and 'their vital role in national development and well being.
- (ii) Directing science and technology efforts along identified national goals, (iii) Promoting the translation of science and technology results into actual goods and services, (iv) Creating, increasing and maintaining an indigenous science and technology base through research and development.
- (v) Motivating creative output in science and technology.
- (vi) Increasing and strengthening theoretical and practical scientific base in the society; and
- (vii) Increasing and strengthening the technological base of the nation (NPST, 1986:12).

(viii) Science and technology, therefore, should not be regarded as autonomous areas of policy, but should be done in association with other areas like economic, social, health, educational and other policies.

Conceptual Issues

The term science means different things to different people. To a layman, science is often seen as

the scientists who carry on the process of science or their works as applied in various forms. Science could be defined from two perspectives: science as a product and science as a process. Science is as an organized body of knowledge.

This view sees science as laws, the theories and scientific conclusions of science. This definition is incomplete. Ogbulafor (2000) and Azubiike (1993), say that science is an organized body of knowledge, which is systematized and produced by careful observation, measurement and experiment which attempts to establish general laws or principles to describe any phenomenon under study. This then means that science is both a particular kind of activity and also the result of that activity. With this in mind, science can be seen as a process of acquiring knowledge about nature and applying the ideas in human life.

The knowledge acquired from the study of science when it is applied to any human endeavour becomes applied science or technology. The word technology comes from the Greek word 'techno' meaning art or skill, and 'logos' meaning science or study. It is the science study or theory of a practical art or skill

Technology is mainly concerned with the application of the results of pure science. Onuoha (1997), defined technology as the practice of any applied sciences that have practical value and or industrial use. Ogbulafor (2000) said that, technology is simply the application of science to the practical aims of human life. It then means that technology, tries to solve the national problems to make the country a better place to live.

The (National Policy on Science and Technology, 1986) says that technology means the way of doing through the application of knowledge derived from systematic investigations of natural forces and materials. It leads to the development of processes and devices indispensable to the enhancement of the quality of life and to human progress. Technology is not a new phenomenon, what is different today is that the discovery of the natural laws through scientific research has given a new dimension to technology, of such massive impact that it offers, almost infinite promise of the relief of poverty and the provision of health conditions of life,

Poverty

The term poverty cannot really be given a straightforward definition. However, some attempts were made by some authors: Lipton and Ravallion (1995), defined poverty as the condition or quality of being poor or unproductive. World Bank (1996, said that a family is said to live in poverty when its basic needs exceed its available means of satisfying them. Abudullahi (1997), said that, if a family's income, which is the total fund available for expenditure by the household needed for feeding and providing other services required in the household, is below a certain standard value, then the family is said to be in a state of poverty. Furthermore, from the international standard, an individual's level of well-being or poverty is measured by his daily income. It is internationally accepted that anyone whose income is less than \$1 US per day can be regarded as living below poverty line (UNDP, 2002). Also poverty means lack of housing, food, medical care and other necessities for maintaining life.

All these definitions of poverty can be summed up to mean the inability of an individual, household or community to satisfy certain basic minimum needs.

There are quite a number of parameters that are usually used to assess poverty for different communities or countries. In this paper, only three parameters will be mentioned. They are as follows: (i) Family Income - If the family income is below a certain relative value, then the family is considered to be poor, (ii) Gross National Product, GNP Per capita - The GNP per capita is the total value of domestic and foreign value - added created by residents of a country divided by the total population of that country. Also, if the GNP per capita is below a certain relation value, the country is considered to be poor; and (iii) Population below relative poverty line - Poverty line is defined as the value of income per person or family that is needed to consume food and provide for other necessary services required for healthy living (Abudullahi, 1999).

Characteristics of Poor Households

Poverty is particularly seen among minorities, in homes without fathers, among the aged, the disabled and people who live alone or with non — relatives, children in crisis and beggar children (Ayandele, 2004). Abudullahi (1999), reported that most of the poor live in rural areas and are involved in farming. Also (UNDP, 2000), reported on poverty situation in Nigeria and said that nearly half of the poor in Nigeria are nearly female headed families, while almost 90% of the non - poor are in families with a father present. From the discussions so far, it would be observed that, poor families have many members with fewer or no jobs and where the household head is employed, there is lower poverty. The low-income people are generally not only poor in a financial sense. The health burden of being poor, the continuing struggle for resources and the stress associated with providing for themselves and all their dependants have their costs.

Causes of Poverty

There are a lot of causal factors, which can explain the impoverishment of individuals, families or social groups in any setting. Some people become poor because they have lost their source of livelihood or because their purchasing power has been reduced. In other cases, poverty is associated with a particular point in their family cycle: for example, is the case of street children. Some poverty also are as a result of sudden shock for example, is the loss of the adult family income-earner, the confiscation of street traders' wares because they work informally, the loss of their house demolished because it was in illegal land or damaged by natural or human disaster, the high cost of an illness in the family. Finally, civil war has generated considerable poverty; Nigerian civil war of 1966 - 1970, was a bitter experience to so many families (UNCHS 1996),

Science and Technology and Poverty Alleviation

L Acquisition of a Strong Scientific and Technological Skill Base

For any nation to be able to cope with the demands of modern civilization, it must strive to acquire a strong scientific and technological skill base. Modern civilization is thus heavily dependent on advanced science and technology. Any nation that wishes to remain stable and self-reliant must strive to raise the standard of living of the people through the employment of certain scientific and technological advances that tend to maximize the exploitation of all available resources. Human development history has shown that sustainable development and self-sustaining progress of any country has generally followed the development and application of science and technology, controlled by response to the needs and endowment of a country.

Many developed countries of the world today, achieved their level of development through the adaptation of technology and development of an efficient science and technology capacity. There is no doubt that the importance of science and technology to poverty alleviation in Nigeria cannot be over-emphasized. In a developing economy like Nigeria, the problems competing for attention are many and diverse in nature. Apart from the fight against illiteracy and poor health care delivery system, there are problems of transportation and security as well as low level of productivity in commercial enterprises. But most important is that all these disabilities can be alleviated by science and technology education.

2. *Application of Scientific and Technology Knowledge to Daily Living*

This cannot be disputed, because the knowledge and application of science and technology brings about creativity, innovation, acquisition and utilization of resources for the general well being of a community, state and nation (Ihediwa, 2001). Hence, the basic need to effectively harness the country's abundant human and material resources for the purposes of massive and rapid industrial growth and economic empowerment depends largely on science and technology education.

For any nation to achieve its goal of poverty alleviation, the scientific knowledge must be applied to the daily living of its citizenry. The Nigerian government has taken some steps in alleviating poverty in the nation, but much has not been done in using scientific knowledge or findings to do so. If science and technology education are fully utilized in the nation building it will be aimed at industrialization.

3. *Development of Cottage/Small Scale Industries*

The growth of industries would strengthen and sustain a healthy and growing national economy. It

was in view of this, that Maryam Abacha introduced the family Economic Advancement programme (FEAP) in 1997, to help solve the issue of growing industries in Nigeria. Abudullahi (1999), reported that the way out appears at development of a programme targeted at industrializing the rural areas. This then means that cottage or small-scale industries should be established in Nigeria. These industries should be resource-based, that is, utilizing raw materials, which are available in different local government council areas of the country.

The development of cottage/small scale industries would help to liberate people from the demands of the federal system and enhanced the economic well being of the family and the society at large. For example, Abudullahi (1999) reported that the majority of the companies, which today dominate the economies of advanced countries started as small-scale industries/family businesses.

4. *Creation of Employment Opportunities*

As the industries grow bigger and markets expand, the small-scale industry has to give way to organized industry thereby employing more workers. The employment of more people in the industry would now help in solving the problem of unemployment. When many people are meaningfully employed, it would eradicate poverty, the rate of diseases would decrease and life would be worth living. Also, a qualitative and vibrant manpower will be put in place to bring about creative employment, well-planned transportation system across the country (roads, water, rail, air cable ways, and pipe born water lines and communication system), (Ihediwa, 2001). The quantity and quality of production of good for home and foreign markets will also grow positively and this will bring about qualitative and efficient communication system in the areas of postal telecommunication system, radio, television and computer services.

5. *Mechanization of Agricultural Sector*

As earlier mentioned acquisition of skills leads to manpower development as earlier said. These acquisitions of skills could also lead to mechanization of agricultural sector. Mechanization and agriculture would be possible in northern states of Nigeria where there is sparse of land. It is estimated that about 70% of Nigeria is essentially in rural settings and they are involved in subsistent farming. The situation in the agricultural sector accounts significantly for the poverty of Nigeria. The agricultural resources should really serve the purpose of alleviating poverty in Nigeria because of successful agricultural sector should provide enough food requirements, supply sector and provide adequate employment and income to the farmers (Aiyegbusi and Balogun, 2004).

6. *Improving Health Care Delivery Services*

Moreso, the impact of science and technology cannot be underrated in the nation's health sector. The performance of the health sector has been affected by our present economic situation as well as some unwholesome situation. Adequate health services continue to remain out of the reach of majority of Nigerians. Abudullahi (1999 citing UNICEF, 1994), reported that infant mortality is high at 85 per 1000, maternal mortality is 1500 per 100,000 per birth. The under 5 mortality rate is 145 per 1000. Malaria is the highest cause of mortality and morbidity among children, followed by diarrhea, dysentery, acute respiratory infections, measles and tetanus. Many of these diseases are as a result of unsafe water supply and unhygienic living conditions. With the training of more qualified personnel, this sector will be sanitized.

7. *Improving the Quality of Water Supply*

Science and technology will also bring about the availability of qualitative and quantitative water supply across the country for domestic use, industrial use and irrigation purposes. An active formal and non-formal education on science and technology are essential for self-actualization, better health and income, improved life-style or quality of life.

Nevertheless, the inclusion of science and technology to alleviate poverty in Nigeria is not without a lot of problems. The implementations of scientific and technological findings are faced with a lot of problems.

Problems of Science and Technology and Poverty Alleviation

The enormous gap between Nigeria and other advanced countries could be traced to the nations educational policies. The nations epileptic growth in economic terms in the midst of plenty is to a greater extent traceable to inadequate technological know-how. Ihediwa, (2001), reported that, Nigeria as a country is good in squandering billions of naira in producing young but unproductive graduates, school leavers and the like because the line of technological thought was systematically towed. Nigeria educational policy makers can propound laudable ideas but regrettably, it is not so in practice and implementation process. A good example is seen in the implementation of last educational policy of 6-3-3-4 systems. The system was intended to empower the children on the technical know-how, thereby making them to be job providers and not seekers. Unfortunately, the vision was lost and this led to poverty, unemployment, prostitution, hunger, drug abuse, robbery, corruption and the like.

For a developing nation like Nigeria to succeed, the culture of technological education must be introduced in the educational system starting from primary schools, secondary and tertiary institutions. Also trained and qualified teachers should be put in place to manage the science section of the educational system. The educational policy makers should refocus their attention on science and technological education.

There is the problem of disseminating the scientific and technological information to the public. The people at grass roots should be taught new ideas in their crafts so that they can maximize output and profit making for local and international consumption. The carpenter should be taught the modern technology in carpentry, the farmer, the welder, etc.

The scientists and technologists are faced with the problem of fund for new research workers. These scientific research institutes are not adequately funded by the government.

The problem of inadequate manpower and over-dependence on foreign technology cannot be overlooked. Aluwong (2004) said that the Nigeria government depended so much on foreign technology that it has not given much attention to the training of manpower and technological advancement. The dependence on foreign technology does not help any nation to advance scientifically and technologically.

The deplorable state of the nation's research scientific institutions added credence to the problems. The institutions responsible for the research aspect of science and technology are besieged with a lot of problems ranging from inadequate research facilities grants from the government and the staff situations.

Finally, there is problem of lack of dynamic curriculum in these practical oriented subjects in our learning institutions. The practical subjects need more space allocation, time allocation and credit unit allocation. Lack of curriculum review hampers keeping abreast with current issues of fast developing science and technology. Aluwong in (Ude, 1996), stated that curriculum must be updated or reviewed in order to update knowledge and skills to match development in commerce, science, technology and so on.

Recommendations

For effective and sustainable use of science and technology in poverty alleviation, the following suggestions are made:

- i. The culture of technology should be inculcated in the life of the citizenry
- ii. The federal government should try and fund the research institutes,
- iii. Government should educate the masses and acquaint them with new scientific and technological ideas,
- iv. Government should give attention to the training of manpower and stop depending on foreign technology and goods.
- v. There should be frequent review of curriculum so as to keep abreast with the current technological issues,
- vi. The federal government and the key people in position should see that the laudable educational policies are well implemented by providing the necessary manpower, materials and manpower or qualified teachers needed to bring it to perfection.

Conclusion

It is a well-known fact that billions of naira have gone down the drain in raising programmes upon programmes to eradicate poverty. This goes without saying that it will take much more than earmarking billions of naira to

eradicate poverty in Nigeria. From the on-going discussions, it is clear that science and technology is a determinant factor in alleviating poverty and increasing the economic well-being of any nation. It, therefore, becomes paramount that science and technology education

should be given serious attention in Nigeria, so that the nation can meet with the pace of technologically developed countries.

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