IMPERIALISM AND GLOBAL SCIENCE: IMPLICATIONS FOR PUBLIC HEALTH DELIVERY AND FOOD PRODUCTION IN AFRICA

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ABSTRACT

Africa is a large continent with a diversity of climatic conditions, unique physical features and a wide range of natural resources. Although hard demographic facts about Africa's population are almost non-existent, there is a general consensus that it is increasing fast. Countries in the continent belong to the underdeveloped in the world; These countries form part of the 42 highly indebted poor Countries (HIPC), where a combination of extreme poverty and financial insolvency mark them for a special kind of despair and economic isolation. They escape the notice of industrialized West almost entirely, unless war or an exotic disease breaks out, or yet another programmed with the International Monetary Fund (IMF) is signed. The study reveals that the continent and in fact the Sub-Sahara Africa is in a state of crisis. The condition in many of the countries are worsening dramatically, even as a global science and technology create new surges of wealth and well being in the richer industrialized countries. For obvious political and economic reasons, the scientific and technological gains in wealthy countries do not readily diffuse to these poor states, and this has negative implications for Public Health delivery and food production in Africa.

Keywords: Imperialism, Global Science, Food Production, Africa.

1. INTRODUCTION

Opinions expressed by different schools of thought on Africa’s paradoxical location in the global division of labor and power have been varied due primarily to the method of analysis, arguments and perspectives each school of thought takes. One school of thought blames the two distinctive problems – public health and food productivity – on Africans themselves for being irresponsible towards science and technology and for looking to the international community to save them, so to speak. While another school contends that the deepening crisis in the region is consequent upon the legacies of colonial and neo-colonial exploitation and mismanagement, the crisis of the state and society, and conditions of poverty, foreign domination, instability; institutional and infrastructural decay and dislocation of the socioeconomic structure of Africa (Ake, 1994), Even the World Bank is of the view that Africa's future, in the increasing complex and competitive, global order is at best, bleak and uncertain:
Sub-Saharan Africa will be falling further behind the rest of the world, based on realistic projections of current policies and Africa's current depressed per capital income level … other developing countries and high-income countries will see their average income levels triple by in the year 2030. Sub-Saharan Africa's per capita income will probably be only US $ 400 by the year 2030, that of the developing countries as a whole will probably reach US $ 2,500 (Hesse, 1993).

It is curious to observe that this sort of projection raises a number of questions not just about the future of Africa, but also about its scientific and technological advancement in the new globalization, what has been the relationship between the industrialized West Africa in global science? What challenges does the current imbalance in global science and technology (in favour of the industrialized West) pose to the African region? What is the place of the environment in the development of science and technology? How do we define the concept of development to capture universal application? What sort of internal restructuring are needed to empower and meet the needs of the region, scientifically and technologically? Is the global system structured in such a way as to make it possible for a debt-ridden, crisis-ridden, and poverty-stricken region to effectively and profitably participate in the emerging global dispensation? The above questions are what this paper attempts to answer. It also tries to offer some proposals on how to deal effectively with the region's scientific and technological backwardness, especially in the areas of public health and food productivity.

2. GLOBAL SCIENCE AND AFRICA'S UNDERDEVELOPMENT

A look at the ecological zones of the globe would reveal that the industrialized West lies in the world’s temperate zones. This zone however includes former Socialist but poor countries as well as the I geographically isolated ones like Afghanistan and Mongolia and the land locked Laos, Malawi and Zambia. African countries inhabit the tropical zones except Malawi and Zambia, which fall in the temperate region. About 93% of the combined population of the 30 highest income countries live in the temperate and snow zones. Life expectancy here is between 70 years and above. In the tropics, Africa in particular, life expectancy is generally much shorter and it averages 51 years, and there is a record of high death rate reflecting the interacting effects of tropical diseases like malaria, hookworm, sleeping sickness and poverty.

Table 1: Life Expectancy and Death Rate for Selected Countries In The Temperate Zones

<table>
<thead>
<tr>
<th>Country</th>
<th>Life Expectancy at Birth</th>
<th>Infant mortality (Per 1,000 live births)</th>
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<td></td>
<td>Female (Yrs)</td>
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<td>U.S.A</td>
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<td>72</td>
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<tr>
<td>Sweden</td>
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<td>72</td>
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<tr>
<td>United Kingdom</td>
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<tr>
<td>Japan</td>
<td>82</td>
<td>76</td>
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<tr>
<td>Italy</td>
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<td>Israel (Jewish) P.P</td>
<td>80</td>
<td>76</td>
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<tr>
<td>Ireland</td>
<td>80</td>
<td>73</td>
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</tbody>
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Source: Webster New Encyclopaedic Dictionary and Public Health Service, National Centre for Health Statistics, USA.
Table 2: Life Expectancy And Death Rate For Selected Countries In The Tropical Zone Of Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Life Expectancy at Birth</th>
<th>Infant mortality (Per 1,000 live births)</th>
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<tr>
<td></td>
<td>Female (Yrs)</td>
<td>Male (Yrs)</td>
</tr>
<tr>
<td>Nigeria</td>
<td>50</td>
<td>48</td>
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<tr>
<td>Malawi</td>
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<tr>
<td>Zambia</td>
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<tr>
<td>Mali</td>
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<td>Mozambique</td>
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<td>Gabon</td>
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<td>Cameroon</td>
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<tr>
<td>Ghana</td>
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Source: Webster New Encyclopaedic Dictionary and Public Health Service, National Centre for Health Statistics, USA.

What agitates one's mind in this ecological division of the world along the lines of rich and poor countries is the fact that all the countries that engaged in colonialism and imperialism fall within the temperate zones while the poor, colonized, imperialized and underdeveloped Africa is found in the tropical zones. Succinctly put the following assertion clearly illustrates global science as imperialism: The imbalance in global science is demonstrated in the remarkable dominance of rich industrialized countries in scientific publications and, even more notably, in patents fields in Europe and the United States. Their scientific output and technological innovation far exceed the rest of the world. It is striking to note that many of the scientific and technological breakthroughs in the industrialized world are made by indigenous from poor undeveloped countries working in the rich country's laboratories. This therefore does not show any intellectual superiority of the West over the rest of the countries. It rather suggests that global science is directed by the rich countries and for the rich countries markets, even to the extent of mobilizing much of the scientific potential of the poorer countries.

Malaria imposes a fearsome burden on Africa. According to Jeffrey Sachs (1999), because the disease is so heavily concentrated in the tropical countries, and overwhelming in Sub Saharan Africa, it kills so much that nobody even bothers to keep an accurate count of clinical cases or deaths. In view of the high deaths caused by the disease, one would think that this would cause global concern and compel the rich industrial countries and private pharmaceutical firms to carry out Research and Development in the area of making a possible malaria vaccine. Ironically this does not happen.

A Welcome Trust study some years ago found that only around $80m a year was spent on malaria research, and only a small fraction of that on vaccines. Also, the big vaccine producers, such as Merck, Rhone-Poulenc's Pasteur-MeriexConnaught and Smithkline Beecham, have much of the in-house science but not the bottom-line motivation. They strongly believe that there is no market in malaria as the zones affected are very poor and cannot thus afford to sell the vaccines when produced. Moreover, malaria is not a temperate disease which may attract their attention.

There is the case of the most dreaded AIDS epidemic, which imposes an even weightier load in Africa than malaria. Two-thirds of the world's 83m Individuals infected with the HN virus are Sub-Saharan Africans and the figure are rising. About 95% of the worldwide HIV cases are in the developing world (Sachs, 1999). Once again, science is stopping at the ecological divide.
Rich countries are controlling the epidemic through novel drug treatments that are too expensive, by orders of magnitude, for the ‘poorest’ countries. Vaccine research, which could provide a cost-effective method of prevention, is dramatically under-funded. As in the case of malaria, the potential developers of vaccines consider the poor-countries markets to be no market at all. The same, one should note, is true for a third worldwide killer, tuberculosis which are still claiming the lives of more than 2 million poor people a year and, like malaria and AIDS, would probably be susceptible to a vaccine, if anyone cared to invest in the effort.

Another issue is the non-recognition of African people’s knowledge of science and intellectual property rights over botanical-medicines and natural resources by Western scientists and pharmaceutical companies. It is a sociological fact that some Africans live in the jungles and rain forests of the tropical belt. It is axiomatically true also that such thick rainforests and jungles must have in them plant (herbal) medicines. There are traditional doctors and herbalists as well as the people who are the caretakers of this wisdom-plant medicine, According to Dr. A. Kweku Andoh, a Ghanaian Ethnobotanist, during one of his botanical expeditions in the Cameroon environs, in the Batanga area to be precise, he was introduced to a plant called Ancistroclatus species by one of the local herbalists. This plant is used widely in the treatment of measles, diarrhea, stomach aches and fevers and is well known anti-inflammatory agent (Andoh, 1993).

It is interesting to note that Gordon Cragg, a member of the team of Scientists from the US National Cancer Institute, once told BBC Radio that a biological extract, michellamine B gotten from Ancistrocladus Korupensis "showed more promise in combating the AIDS virus than any other substances to date. But it is curious to note that a daily newspaper of California, the “San Francisco Chronicle” of May 30, 1992 and the BBC Radio, reported that a traveling British botanist had ‘discovered’ this plant in the Korup National Park vicinity' in Cameroon. They reported that the botanist picked the leaves from the forest floor, declaring that “the local people don't have any use for it … They don't even have a name for it’. Since, the botanist who "discovered" this plant claims that the Africans did not know anything about it, our question is: who did he ask? What sources did he consult? The odds against a chance discovery of such a valuable plant medicine are very great. We strongly suspect that the travelling botanist was led to the plant by a traditional doctor herbalist whose people have resided in these remote jungles from time immemorial. Again, the fact that the traditional doctors knew that this plant is effective in treating measles, a virus, shows clearly that this plant should be tested for possible use in other virus infections including AIDS. This information was probably passed on to the travelling botanist.

It is to be logically argued that the European and Asian scientists who have invaded the African rainforests have all decided that if any useful plant-based medicine is found, they will claim that the Africans did not even know about that particular plant. They could then proceed from that point to deny these traditional healers any financial compensation for their "intellectual property". It is our contention that this claim is the 'new code' word to be used to deny indigenous people any payment for their own knowledge, their "intellectual property". Otherwise, how could a foreigner wander into somebody's compound and discover something the person (owner) was not aware of? If by some remote chance this occurred, how could this foreigner then place claims of ownership on the vegetation on the person's grounds, surrounding the person's horns? Would the botanist claiming "discovery" of the person's plant receive the financial compensation reserved for the patent holders of medicines? Would the traditional doctor whose "intellectual property" was exploited be appraised of the importance of this "discovery", or would the botanists and their cohorts stick to their claim of ownership based on this so-called "discovery". The position of these western scientists is indeed akin to Mungo Park's claim over the "discovery" of the River Niger of Nigeria. A place where local people live on the banks of the river before his arrival on the voyage of discovery. This typifies a classic case of the new imperialism in global science.
The World needs to reconsider the role of institutions such as the World Health Organization and the Food and Agriculture Organization in the provision of public health and food productivity. In part this will require that the wealthy governments enable the grossly under-financed and under-empowered United Nation's WHO and FAO to become vibrant and active partners in human development. But the failure of the United State to pay its UN dues is surely an indictment of their government. This further strengthens the argument that American neglect of the UN agencies that assist impoverished countries in public health, science, agriculture and the environment must surely be a new wave of imperialism in America-knows the vital roles these UN bodies should play in identifying global priorities in public health and agriculture, and also in mobilizing private sector Research and Development (RSD) towards globally desired goals. There is no escape from such public-private collaboration. It is notable, for example, that Monsanto, a life sciences multinational based in St. Louis, Missouri, has a research and development budget, that is more than twice the Research and Development budget of the entire worldwide network of public-sector tropical research institutes. It is also known that Monsanto research is overwhelmingly directed towards temperate-zone agriculture. As well, globally, WHO estimates that more than $56 billion a year is spent on health research-but less that 10% of that sum is directed toward diseases that afflict 90% of the World's population.

Also, between 1975 and 1997, an impressive 1,22.3 new compounds of drugs were launched on the market. But as Patrice Trouiller, a consultant with Medecins Sans Frontieres (MSF), an aid group, points out, only 11 of them were designed for tropical diseases (Sachs, 1999). As with malaria, poor food productivity in the tropics is not merely a problem of poor social organization (for example, exploiting farmers through controls on food prices). Using the current technologies and seed types, the tropics are inherently less productive in animal food crops such as wheat (essentially a temperate-zone crop), rice and maize. Most agriculture in the equatorial tropics is of very low productivity; reflecting the fragility of most tropical soils at high temperatures combined with heavy rainfall.

However, scientific advances in the West offer hope. For instance, biotechnology could mobilize genetic engineering to breed hardier plants that are more resistant to drought and less sensitive to pests. To be sure, Calestons Juma, one of the world's authorities on biotechnology in Africa, stresses that these are improved through directed biotechnology research (Sachs, 1999). Such Research and Development are now all but lacking in the poorest countries. Yet the western scientists and pharmaceutical companies that have the wherewithal fail to explore these areas to attend to the problems prevalent in the tropical zones. The big life sciences firms doubt the possibility of making high profits in view of the high poverty level of the tropics should they go into the venture.

The rich countries are filling the atmosphere with increasing concentrations of carbon that add to the burden of the poor tropical countries. Anthropogenic global warming, caused by the growth in atmospheric carbon, may actually benefit agriculture in high-latitude zones, such as Canada, Russia and the Northern United State, by extending the growing season and improving photosynthesis through a process known as carbon fertilization. Studies have shown that this process is likely to lower tropical food productivity. Because of increased heat stress on plants and because the carbon fertilization effect appears to be smaller in tropical eco-zones.

According to Kaniaru (1998), global warming is also contributing to the increased tropical climatic disturbances, such as the "one-in-a century" El-Nino that hit the tropical world in 1997-98. In the face of all these efforts are not made by America and others to address the climate damages that are being imposed on tropical countries that are already impoverished. Herein lies why tropical Africa has to rely on the exploitation of its environment for the resolution of the various problems confronting it and the challenges global science and the rich industrial countries pose to it.
3. TECHNOLOGY, ENVIRONMENT AND DEVELOPMENT

Of necessity, man must exert some of his energy and creative ability to convert the leaves, grass, trees, sand, wool and other natural resources to become food, shelter, clothing, etc, and hence transforms the environment to a comfortable habitation. The first historical act of man is therefore the production of material life itself. Karl Marx contends that, human history has to do with man's struggle to dominate and control the environment that appears hostile and unfriendly, physical and social. This is exactly the history of Africans, who reside in the tropical zone of the globe with a terrible burden of unpredictable and highly variable water supplies. To be able to survive and live a comfortable life in this environment, the people had to devise techniques to achieve this. New opportunities provide new abilities for man. Africans must thus develop themselves to high levels of status and intelligence. It is this that explains the emergence of progressive technological development dictated the environment. Marx (1978) understands this re-making of man's own lives as the true meaning of human work, which is to occur within the framework of a progressive historical evolution.

Considering the geography of the continent of Africa, the people found here have to ingeniously device tools, instruments and other means to exploit the environment to enable them survive, and survive comfortably. These tools and the instruments of labour as well as the idea and knowledge of how these are organized in a particular way constitute the indigenous science and technology of the people. Technology refers to the forms of tools, artifacts, and techniques employed by a particular peoples to modify conditions and resources in their environment to meet their basic material needs. For example, those living along river banks, a knowledge of various fishes, when they can be harvested, where they are found, which parts are edible, how they should be prepared and cooked and how to make instruments for their procurement are all bits and pieces of the technology in the fishing vocation (Jaja and Ifeanacho, 1998). This means that science and technology blend with the physical environment. This is an arrangement built upon the principle of opposition between man and nature on the one hand, and between man and man on the other hand.

Extrapolating from this perspective, science and technology can be seen to account for what constitute the development of a people. Development, however defined, is an uneven process. Yet it has a universal application, it represents the transformation of the physical and social environment within which human beings operate for purpose of enhancing their standard of life. It assumes some kind of effort necessary to eliminate whatever obstacles militate against the desire of individuals and groups. Viewed against this back drop, Anikpo (1996) perceives development holistically as the consistent attempt by human beings everywhere to free or emancipate themselves from all natural and man-made obstacles for purposes of achieving more comfortable, self-satisfying and peaceful conditions of life. The Marxist theory of development for instance, recognizes the central element of change in the development process and identified the universal laws of dialectical and historical materialism as the articulating focus of development, irrespective of time and place. In this connection, the Juche' (Korean translation of self-reliance') philosophy explains that it is the responsibility of any human group everywhere to use their own initiative and creativity to harness their own resources by themselves for their own development (Jog, 1982).

For development to take place in any society, new orientation has to be fashioned out of the old, discarding obsolete ideas and technology and replacing them with new ones. The emphasis must be on the improvement in skills with which the local population performed their traditional production tasks, and not the wholesale abandonment of those tasks. This was what brought the often quoted wonders of the Japanese experiment (Nnoli, 1994). The implication of this therefore is that development is indigenous, involving the continuing improvement upon what already exists and bringing it to a state of perfection within its gamut. It means that imitation, borrowing from or adopting what is foreign and ignoring what is
indigenous would not help or constitute development in the real sense. What is borrowed cannot enhance development because it does not belong and cannot be integrated without leaving some ugly patches, which would destroy the beauty of what is indigenous. Consequently, in the views of Anikpo (1991: 9), development.

"... enables us to see that the potential for development is inherent in all human societies. What differ from one society to another, and make the difference in levels of development are the historically and culturally based pool of resources, tools and strategies which members (If a society are able to mobilize towards specific ends. While some societies, by circumstances of history, retained the initiative and control over their resources, strategies and productive forces, others, to a large extent, seem to have lost control over these emancipatory forces. This raises the question of how much loss of control and initiative occurred. Thus the sociologist being the search for the historical forces that shaped the interrelationship between various societies, which culminated in some being developed, and others being underdeveloped.”

From this perspective, science, technology and development can’ be said to be universal phenomena. Africans, thus, have to utilize the' abundance of natural resources they are endowed with, to improve and better their state of being. Once a society is able to organize its agriculture and its ‘ability to control nature and harness vast forest and barren lands into productive farms. It would be able to solve its basic food problem, and people will develop fully mentally and physically, and will devote a larger part of their time to solving other problems of development and making life more meaningful (Heinecke, 1985).

Europe, for example, took the lead in many fields, particularly science and technology, because of her ability at a very early stage to control nature to a great extent, and hence agriculture. Fertile soils, a fairly good climate, knowledge of metallurgy applied to food production, and overseas conquests, provided the initial impetus for European civilization (Nnoli, 1994). The invention of other arts was necessary to force mankind to apply itself to the art of agriculture. The link between art and craft, metalwork to agriculture provided a technology that removed some of the human' suffering in the process of agricultural production, as well as increasing productivity.

Africa has to therefore use the resources at its disposal to battle nature for the betterment of her societies. Under this programme, heavy emphasis will be placed on the use and adaptation of indigenous technology and encouragement of local craftsmen. Efforts by both modern scientists and craftsmen, working together as equals, will be deeply involved in trying to make within our present development simple labour-relieving machines, drawing on the experience of scientists all over the world. In this wise, endogenous breakthroughs in science and technology as recorded in Nigeria, for example', have to be encouraged, developed and sustained. Project Department Agency (PRODA), Enugu-Nigeria has invented several gadgets of great commercial potentials. They range from maize shelling and palm kernel cracking machines, Garri processing machines to a moimoi steam cooker capable of cooking about one thousand of these highly popular dishes in an hour (Odum and Afuyi, 1984).

The Federal Institute of Industrial Research (FUR), Oshodi in Nigeria is devoted to middle level technological innovations. It has so far developed among others, the corn decorticator, which is now widely used for the processing of corn and the production of corn flakes. Some of the equipments and products awaiting potential investors include smoked fish dryer, fabricating machine and a fertile testing gadget (Odum and Afuyi, 1984). The Abakiliki based Agricultural and Development center invented a drought control device and an African mechanized hoe. These innovations, it was agreed by experts, would benefit agriculture.
University of Ile-ife (now Obafemi Awolowo University). In Nigeria is yet to get investors for inventions which have since been produced, in commercial quantities, electric powder, automatic yam planter, cassava harvester, industrial battery charger (Odum and Afuyi, 1984)

What about the silent revolution: the principle of self-reliance which the Biafran war in Nigeria brought into focus, the unleashing of the greatest creativity in the people when faced with challenges (Nzimiro, 1984). Maximum emphasis in all fields of education should be directed toward refining and improving indigenous skills and products. For example, chemistry students must practically work with local soap producers, oil distillers and food processors. After all, the black soap which many of our people despised in the past are what our ladies proudly use today in the name of 'Dudu osun' and this soap is a product of indigenous technology (Kosemani, 2000). Architectural students must stop learning how to design skyscrapers while their mothers and father live in sacks and start learning how to apply modern architecture to improve our present traditional housing system at low cost With maximum comfort, in view of the prevailing economic crisis facing the people. Nigeria has something to offer in this respect. If we take our mind back to the fishing communities and the way they build their dwelling places on water, it will not be so sophisticated but it serves their purpose admirably. Among the Hausa Fulani communities, they build 'their houses with mud. But enter them during the very hot months; one notices that these buildings are very cool inside.

The point to note here is that science and technology can only be built and guided by indigenous rationale, strategies and methodologies which come directly from a person's value system. This means our development curriculum has to be negotiated and tailored to individual and societal needs. As mentioned earlier, Japan and Taiwan as well as the Korean countries have shown that technology needs a distinctive national stamp to make it meaningful. In other words, science and technology have to be domesticated. That means that no matter how good a technology is, if the design is insensitive to the culture and the language of the people, such a programme will not fully achieve its aims and objectives. It means recognition of other sciences as found in an environment other than western modern science and technology. To be sure, the pharmacy programme at the Obafemi Awolowo University, Ile-Iife in the 70s had an indigenous component. The section dealt with indigenous medicine (Kosemani, 2000). In the late eighties and early nineties the University came up with a pharmaceutical device that could cure sickle cell disease.

It is against this background, that one gets disturbed about the battle of supremacy over the claim of two people who said they could cure the most dreaded AIDS disease. What is needed, in our considered judgment, should not be a contest between the Nigeria Dental and Medical Association and Dr. Jeremiah Abalaka and co, but a verification of the claims within the context of our environment and prevailing circumstances. We recall the same controversy raged between a researcher at the University of Nigeria Nsukka and Oshodi Research Center when the researcher at Nsukka claimed he had manufactured a vaccine for cholera in the seventies. The point is, as Gbamanja (1990) indicates, the importation of technology, which has nearly succeeded in sustaining people's lives, has failed to educate us as people. The result of course is, that we have turned away from our local practices, which have sustained our culture and have opted for foreign cultural values and gadgets, which are not very well adapted to our society. This brings to focus our distorted, truncated and disarticulated technological development.

Countries in tropical zones have failed to tap the abundance of resources available in their environment. The presence of all year round abundance of sunshine and tropical climate could be tapped for the benefit of humanity. Solar Electric Power could be generated from the solar energy to solve most of our problems that require electricity. This requires the collaborative efforts between government, private individuals and research institutes. The benefits derivable from this source of power are enormous. This is so because; the interest of the rural people in Africa can easily be accommodated. Though the initial cost if-high
economically, it is the cheapest power source as there is little or no maintenance cost. In the area of public health, it can be used to purify water and thus rule out water borne diseases such as river blindness etc, and it does not generate noise associated with electric generators. Indeed, Solar electric Power does all that the conventional electric power does, among others.

4. FUTURE CHALLENGES

As global science has brought to bear on rich countries improved and efficient medical practices, science and technology, academic research, abundance of food, resulting from effective and efficient agricultural productivity, and you name it, African nations are still wallowing in confusion, poverty, the recycling of outdated and already discarded technology, recycling of outdated information and ideas, misplaced priorities, neglect of basic human needs, neglect and exploitation of our environmental resources, increased disease, environmental degradation, conflict and refugee flows, etc.

The human costs of these are indeed terrible and this should challenge us. As already stated, the rich-countries research on rich countries ailments, such as cardiovascular diseases and cancer, will not solve the problems of malaria, tuberculosis tropical-related diseases confronting Africa. Nor will the biotechnological advances for temperate-zone crops easily transfer to the conditions of tropical agriculture. Using current technologies anti seed types, the tropics are inherently-less productive in annual food crops such as wheal, rice and maize. To address the special conditions of Africa and HIPCS, we must first understand their unique problems, ecology, and then use our ingenuity and co-operative spirit to create new methods of overcoming them.

According to the "West Africa" magazine, of 1-7 November, 1993, the United States Agency for Food and Drug Administration (FDA), which oversees all food products and drugs manufactured for human consumption in the US, approved the clinical trials of the drug 'Ibogaine' for the treatment of drug addiction on August 25, 1993. This was the last step towards the complete determination and usage of this probably one of the biggest sellers of the pharmaceutical markets of Europe and America now (Andoh, 1993). The challenge of Africa which possesses the knowledge of the healing plant and other of the rainforest and other tropical vegetation zones, is to ensure that the people, the caretakers of this wisdom, the traditional doctors and herbalists are compensated for the use of their 'intellectual property'. Above all, the governments of the region must exploit and develop the availability of these plant resources for the good of the people. They must realize that these plants” are endemic to only a small area of the region and it thus behaves on them to effectively and efficiently manage the resource.

The pool of a numerous technological innovations made by research centers to suit our environmental needs and circumstances have to be used voraciously encouraged and, invested upon. In this way, our technology can be boosted. The pursuit of this knowledge can generate This implies the adoption of multi science and multi-technology to frontally attack the various problems facing Africa, The idea is that there are many stocks of knowledge located In different cultural settings, some of it half-forgotten, much of it able to stand the test of modern scientific validation, and there is also new knowledge being created by research and development systems emerging in rural settings (Wignaraja, 1984). The challenge, therefore, is that there is a greater technological/choice, that is, many options in the selection of appropriate technology according to people's environment for all-round developmental needs in Africa. This choice cannot any longer be left solely to the technocrats who believe in the one stock of knowledge western model of development. The Gindiri (in Plateau State of Nigeria) special equipment used for the teaching of visually handicapped (blind people) is an example of an adaptation of simple imported materials within a given local environment, Ihonvhere (1989) and a refutation of one stock of knowledge syndrome prevalent among bourgeois scholars and the Western countries. The strategy of technological choice therefore has to be related to a social philosophy, the local
resource position, and factor distribution. The conventional approach to public health and agricultural development as well as other areas of development has glossed over the details of technological complexities, ruling out substitution possibilities, assuming there was only one primary factor of production and ignoring organizational, institutional, psychological, and environmental questions.

5. CONCLUSION

African countries must prevail in the international community to allow the system of intellectual property rights to balance the need of providing incentives for innovation. The struggle over AIDS medicines in some parts of Africa has to be encouraged and seen as a fundamental step towards effective access to the fruits of human knowledge. The issue of setting global rules for the use and development of new science and technologies should require global cooperation, not the strong-arming of the few rich industrialized countries. The quality and pace of development will be dictated by the degree of clarity and understanding of practical daily problem we meet and how to use a revolutionary approach with environmental content to overcome them.

Africa must learn to deal with their priorities in terms of their determination founded upon its need and sustenance. Its human factor must be rooted in the knowledge of Africa, its aspirations, challenges and opportunities. As a matter of priority and foundation for a new beginning, the continent must dismantle all the oppressive, exploitative, and anti-human development structures within the states that subordinated its culture and institutions, values of its knowledge, science and technology.

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