Towards Sustainable Development: An African Perspective

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It is with much trepidation that I rise to give this lecture, the first since I was made an honorary graduant of the ancient University of Copenhagen. I never thought twenty years ago, when I was invited by the late distinguished Professor Axel Schou to give my first lecture at the Institute of Geography, then located in Haraldsgade 68, that I should have the rare privilege and distinction of being the first geographer to be awarded an Honorary Doctor of Science Degree by this University. I cannot pretend to believe that others are not more deserving. I do, however, appreciate the honour you have done to my continent, my country, my university, my family and myself by this award. May it be a source of inspiration to scientists in the Third World.

This honour has come about as a result of the inspiration and encouragement that I have received from distinguished professors, lecturers, technicians, the administrative staff, and above all generations of students of this university. Some of them like Professor Sofus Christiansen, Henrik Jeppesen, Steen Folke and the late Per Kongstad, just to mention a few, have shared my research interest in the problems of Third World countries. We have also had an abiding faith in the kind of development process which is based on the active participation of the beneficiaries – the people. We have learned to listen to some of them during our field researches to ascertain their needs, their aspirations, and above all to benefit from their wisdom and knowledge. We have done this in our conviction that the view from the ground, from where people live and work should be taken into account in the search for solutions to their problems. As Salmen recently observed "policy makers and development planners who formulate and implement rural development projects and programmes are often far removed from the people for whom these activities are intended".

Credit for this award should, therefore, ultimately be given to the peasant farmers in the villages in Ghana with whom I have interacted for more than 30 years and from whom I have learned so much without being able to bring about a qualitative change in their living conditions. Although I have contributed to the understanding of their problems, many of them still live in abject poverty and deprivation. The incidence of poverty in rural areas of Ghana is more than eleven times the incidence in Accra, the capital city of the country.

The euphoria of independence with its promise of improving the quality of life of Ghanaians through the transfer of Western technology, resources and ideas is giving way to a feeling of despair. The Ghanaian experience is shared by other African states. Having gone through three UN Development Decades without alleviating poverty on any scale, it is not surprising that past development strategies have come in for greater scrutiny and appraisal. The belief that development planners, technicians and experts possess all of the knowledge, wisdom and virtue needed to achieve development, and that the poor should be responsive and grateful beneficiaries has been found to be a paternalistic fallacy. There is an increasing realization of the need to draw both on local know-how and the achievements of modern science and technology in the search for solutions which confront the developing countries of Africa.

The same approach should animate the search for strategies which can promote sustainable development which is the theme of this lecture. According to the Oxford Advanced Learners Dictionary, Sustainability refers to "keeping an effort going continuously, the ability to last and keep from falling". Development is the way in which people meet their needs and improve their lives. Sustainable development is therefore the kind of development which meets the needs of the present without compromising the ability of future generations to meet their own needs. Long before the concept of sustainable development became the buzz phrase of development among ecologists, development planners and other experts in the 1980s, one of the most prominent Ghanaian chiefs, the late Nana Sir Ofori Atta expressed the concept of sustainability with respect to land in the following words, "I conceive that land belongs to a vast family of whom many are dead, a few are living, and countless hosts are still unborn". All the principles of sustainability are enshrined in this saying. Land must be used in such a way as to satisfy the needs of the present generation without depriving future generations of their source of sustenance. Development must not damage or destroy the natural resource base.

The concept of sustainability is, however, broader than sustainability of the natural resource base. It has other attributes. Development must be economically sustainable. It must involve real economic growth that can be sustained. All too often development projects introduced by change agents, governments, and donors in rural areas in Africa have had the impact of raising rural incomes and improving the living conditions of the people in the

course of implementation of the projects, when external resources and expertise are readily available. But as soon as the life span of the project comes to an end, things begin to deteriorate. Part of the reason for the non-sustainability of such projects is the fact that the so-called beneficiaries, the rural people, are often only passive recipients of these projects. They are not actively involved in the design, implementation, and evaluation of these projects. Real development – sustainable development – is something people do for themselves. It is something done with people not for them.

This brings me to the other element of sustainable development. Development must be socially sustainable. It must increase peoples' control over their lives and maintain and strengthen community identity.

The three components of sustainability – environmental, economic, and social – are of course interlinked. It is after all, poverty which is one of the major causes of environmental degradation. It is no good telling a poor charcoal burner near Kumasi that he is damaging the environment when he cuts down trees. He does not have much alternative if he has to feed his children or pay their school fees.

Sustainable development must therefore focus on the relation of people to renewable natural resources. People are part of a natural system with which they interact. They depend on it for food, water, air, fibre, and construction materials to cite a few examples. This means that whatever the resource in question – water, soil, fish, forests, or wildlife, it can only be well managed if questions of population, development, and resource conservation are treated together as an integral whole. Environment conservation must go hand in hand with economic growth.

Some of the major environmental problems which Africa faces have come about as a result of the increased population pressure on resources. Africa's rate of population growth, which is between 2.8 per cent and 3 per cent per annum, is the highest in the world. Population growth rates for individual countries vary, but about half fall in the 2.7-3.5 percentage range. For Sub-Saharan Africa as a whole the World Bank's standard projections show population continuing to grow by 3 per cent a year until nearly the end of this century, from about 460 million in 1985 to 730 million by the year 2000.

In many parts of Africa there are huge and cruel imbalances between the human population and the resources which they can command, resulting in poverty, malnutrition, and ever declining resource base. According to some estimates some 3.7 million hectares of forests and woodland are disappearing every year. In West Africa 4 per cent of the closed forest is being cleared every year. More serious still is the gradual removal of trees scattered among farms and pastures for fuel wood, although crucial in protecting productive land against erosion. Agricultural expansion together with world timber trade and wood fuel demand have destroyed much forest cover. It is estimated that about 70 per cent of deforestation in Ghana is attributed to shifting cultivation because the traditional bush fallow system of cultivation involves the slashing and burning of forests and grassland. As populations grow, more and more bush is cleared for agriculture, and expanding herds of livestock weaken plant cover. Once the vegetation is removed the fragile soils become subjected to wind and gully erosion.

There are no comprehensive surveys of the scale of erosion in Africa, but scattered reports build up an alarming image. A 1979 study by FAO and UNEP found that 36 per cent of the land area of Africa north of the Equator is susceptible to some degree of wind erosion. According to another FAO study in 1984, no less than 130 million hectares of Africa's total cultivable area of 789 million hectares could be reduced by as much as 29 per cent.

Everywhere soil is being lost faster than new soil is being formed. Deforestation and soil erosion are undermining the very resources on which African farmers and their families depend. Crop yields are falling and fuelwood is growing scarcer. In the drier regions of Africa, desertification is the most dramatical and alarming form of land degradation in which the biological productive capacity of the land is more or less completely destroyed. Desertification is a composite process involving the processes of overcultivation of the land through intensification and the reduction of the fallow period, bush burning, deforestation for fuelwood and construction materials, and overgrazing. These processes are often occurring simultaneously at the same site. The dangers are spreading. The most severe threat hangs over the Sahel where it was estimated that 61 million people lived in areas which were undergoing severe desertification in 1983. According to the Executive Director of UNEP: "If the present rate of desertification continues by the end of this century, some Africans may not be able to get firewood closer than 900 miles from some cities such as Khartoum in Sudan".

Africa has become a major challenge to world development. It has become a continent of crises. It is overburdened with debt crises, it faces food crises, it has the most unfavourable terms of trade with the developed countries. But Africa's environmental crisis appears to threaten not just the hope of progress but even the hope of survival. There is now a growing concern in Africa about environmental degradation. As Julius Nyerere remarked: "Until the last few years Africa regarded environmental concern as an American and European matter. Indeed there was a tendency to believe that talk of environment was part of a conspiracy to prevent modern development on our continent. Now we have reached the stage of recognizing that environmental concern and development have to be linked together if the latter is to be real and permanent".

Small scale farmers are often blamed for land degradation in Africa as if they had a choice of resources to depend on their livelihood when really they don't. In the context of basic survival today's needs tend to overshadow consideration for the environmental future. It is poverty that is responsible for the destruction of national resources not the poor. But problems of the environment are global problems. Natural resources and the environment are not only the concern of national governments in African or developing countries of the world. The people of industrialized world consume or degrade a disproportionate share of the world's natural resources. Many environmental effects such as global warming, destruction of the ozone shield, deforestation, and forest decline are global or transnational. It is in this respect that two major publications: "Our Common Future", 1987, and "The World Conservation Strategy", 1980, both called for profound policy and institutional changes at international level and a renewed commitment to multilaterism. Their recommendations affect industrialized and developing countries alike.

I have given examples mainly from Africa of what is not sustainable development. We are in danger of depriving the "countless hosts still unborn" of forests, fertile soils, clean air, and other sources of livelihood. How can we prevent such a catastrophe?

To begin with we need to know the extent to which we have degraded our resources. What is the extent of desertification, deforestation, or erosion, for example? We also need to delineate broad land categories according to their suitability for different uses. Which areas are capable of sustaining intensive cropping and higher populations and consumption levels? Where are the degraded areas which should not be developed for intensive agriculture? Where should development be converted to other uses? Which areas are completely denuded of vegetative cover? Which areas have either totally lost their productivity, or in which areas has productivity been drastically reduced and needs to be restored?

Identifying land according to "best use" criteria requires information that is not always available. Most industrial nations possess inventories and descriptions of their lands, forests, and waters that are detailed enough to provide a basis for mapping land use categories. Few developing countries of Africa have such inventories. Certainly it is a major requirement for Ghana. Technology is of course available for preparing a land use inventory of Ghana using satellite monitoring and other rapidly changing techniques. It is in this respect that I am happy that this famous Institute has developed a remote sensing capability.

It is my sincere hope that through the cooperation between our two universities and with the assistance of DANIDA, this Institute will assist Ghana to develop a remote sensing unit at the University of Ghana which will undertake what, no doubt, is a first essential step towards proper management of our resources.

The preparation of a land use categories map is only a tool of analysis of the problem of environmental degradation. As long as population continues to increase, the length of fallow is shortened, there is overgrazing, and there is demand for fuelwood in the rural areas of Africa problems of land degradation will continue to be exacerbated. We know what non-sustainable development is. The challenge today is to find innovative ways of solving the problems that Africa faces beginning with food production, to ensure sustainable development.

Although there is the temptation to repeat Asia's success of green revolution based on a package of high yielding seed varieties, use of chemicals, pesticides, and mechanized cultivation techniques, it is clear that given the circumstances of Africa, we need the kind of technology which provide the highest pay offs at the least environmental and financial risks.

Increasingly, particularly since the 1970s scientists in the Third World have been paying attention to improving traditional farming systems. Among the innovations being investigated is *no tillage*
technique which involves little disturbance in the soil structure. The seed is injected in a hole, stumping and root removal are unnecessary. Weeds are sprayed with weedicide, and crop residues are left to rot on the soil. The system protects the soil from erosion especially in the early period after seeding when the crop canopy is still developing. It reduces energy requirements, enhances timely planting and flexibility of operations, and reduces investment in machinery. No tillage techniques have been developed at the International Institute of Tropical Agriculture at Ibadan and the University of Science and Technology in Kumasi. No tillage has been found suitable for maize, cowpeas, soya bean and cassava.

Another important area of research is how to eliminate or shorten the fallow period without impairing the fertility of the soil and thereby decreasing yields. This observation by an Indonesian scientist who works at IITA Ibadan is very instructive. According to him: "When I arrived at IITA, I thought we knew the answers to Africa's problems. We made contour bunds but we still got tremendous erosion. We used chemical fertilizers, but the soil grew more acid. Then we started to look a lot more carefully at what African farmers themselves were doing. We found they were using trees and shrubs in the fallow period to restore soil fertility. But the problem with the fallow system is that it stays at a very low level of productivity. Yields fall off steeply if the plot is cultivated beyond the first year. So we asked: "Can we improve the traditional system? Can we organize it?" Kang was familiar with Eastern Nigeria where farmers forced to intensive techniques by popula-

tion density had integrated trees into their arable farming. Kang had the idea of systemizing and simplifying the practice so that it was easier to research and reach farmers. The result was *alley*
cropping. The first field trials at Ibadan started in 1976. Agroforestry research is now being undertaken in a number of countries spearheaded by ICRAF with headquarters in Nairobi.

The combination of lucerna plant which is fast growing with crops such as maize and yam has the advantage of maintaining the fertility of the soil while at the same time it provides trees for fuelwood. The Ministry of Agriculture in Ghana is promoting agroforestry in the country. Although agroforestry has been practiced by African farmers for decades, there is the need for more research in identifying the most productive species, breeding improved varieties, and testing out management methods. Inevitably it will be the farmers who will develop the detailed combinations suitable for their specific environment, their needs and possibilities.

Research into another traditional farming practice - mixed cropping – is also yielding interesting results. The combination of maize and groundnuts reduced corn borer damage to one sixth of the level in corn alone, and attacks by diamond-backed moth on cabbage fell sharply when cabbage were planted closely with tomatoes.

If there is an increasing awareness of the need to indigenize science and technology in order to solve Africa's problems, to what extent can we expect some of these innovations cited in this lecture to continue?

Progress in this field requires some changes in attitudes of governments, donors, and scientists. It has taken researchers in Africa several decades to realize the need to build on indigenous knowledge. It is at times difficult for some professionals to accept that they have anything to learn from people, or to recognize that there is a parallel system of knowledge to their own which is complementary, usually valid and at times superior. They do not realize as John Hatch has written: "The small farmer is a professional".

What about government attitudes to indigenisation of science and technology? Post independence African governments have not generally addressed the issue of technology seriously. Each African country has to address questions such as "Does the country have an appropriate technology? Can it develop it? Can it adapt imported technology? What resources will be needed? Following the work of Schumacher, the author of "Small is beautiful" a number of centres have been established in African countries to promote the development of appropriate technology. One such centre is the Technology Consultancy Centre based at the University of Science and Technology, Kumasi. The centre has been able to fashion farm implements and equipment which are improvements over the traditional hoe. It is, however, one thing such developments taking place in pilot centres, and quite another thing getting the innovations diffused throughout the population.

Mr. Chairman. I said earlier in this lecture that Africa will for the next few decades constitute a major challenge to world development. Indeed judging by the generally negative news from Africa which attract the world press, we are tempted to give up hope for Africa ever solving its problems. Yet there are signs of hope. We need to focus on what does work, not what has gone wrong, on successes rather than failures. Increasingly, development agents, policy makers, donors, and scientists are coming to a consensus that real development – and that is sustainable development – is something people do for themselves. It is something done with people not for them. People must feel responsible for their environment at the same time that they exploit the environment to meet their needs – I mean felt needs because as the late Mahatma Gandhi pointed out: "There is enough in the world for man's need, but not enough for man's greed". Although the industrialized countries constitute about a quarter of the world's population, they consume three quarters of the world's resources. Being responsible for our environment also means that we constantly remind ourselves that we have only borrowed the resources of the world from our children and great grandchildren. After all, as Nana Sir Ofori Atta reminds us, land belongs to the dead, the living, and the countless millions unborn.