

LECTURE SUMMARY

Science and development in Africa: the greatest challenge to science and technological innovation of our generation?

Held at the British Academy on 5th December, 2012

Chair: **The Earl of Selborne GBE FRS**
Chairman, The Foundation for Science and Technology

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PROFESSOR WHITTY outlined the importance of Africa in the world economy. Its population was estimated to double by 2011 to reach 2 billion, one third of the world's population. Its economic growth was rapid - many African states had growth rates of 7 to 8 per cent. It should be able to benefit from scientific advances, but it has done so much less well than other economies. In health, water, power, communications, resilience and coping with climate change, it was weaker. Science and innovation can, of course, help. It can provide new technologies, reduce the cost of existing technologies, provide better ways of delivering services, and improve understanding of the environment and health.

He listed three areas where science could help in agriculture - by improving yields of crops through seeds which are more resistant to drought, pests and disease; by getting better nutritional value through bio-fortification of grains (e.g. vitamin A enriched sweet potato and rice, and iron fortified beans); through better agricultural practice and reducing post harvest loss, by use of fertilizers and water and better storage and transport. But, in order to make major improvements in the yield from land (Africa is amongst the lowest yielding continents), it was necessary for all three improvements to be exploited.

Science could also help in combating animal diseases, which decimated flocks and herds. The elimination of rinderpest had been a great success. More research was now needed to combat diseases such as East Coast fever and Trypanosomiasis.

Science could also do much to improve human health through developing preventative technologies (e.g. for HIV); improving the infrastructure (e.g. cleaner water and better sanitation); better diagnostics; and more effective drugs.

But, there were many problems in the successful deployment of scientific knowledge and technological improvement. With vaccines there were some which were technologically good, but whose deployment was poor (for example polio and measles); some where development was still continuing (for dengue and rotavirus) and some where fundamental research was still needed (HIV). The path from research to use in practice was long and complex. It included lengthy trials, doubtful public acceptance, and problems of availability. Moreover, vaccines can never provide the complete solution. Other technologies are needed. But not all need be complex; some can be very simple, such as using a simple water filter.

Drugs also do not provide a complete answer to diseases. Some drugs are very effective, but poorly deployed because of religious or other hindrances; some are effective, but their effectiveness may be eroded through over use; some are very expensive or have side effects

In all areas - agriculture, animal and human health - the application of improved technology must play a part in getting scientific discoveries to work. But on its own it is not enough. Scientific research and technological innovation must work together.

Through multiple interventions, child mortality had fallen, but population increase was led by increased fertility. This was not an unusual pattern. It took some time before populations accepted they did not need to have many children. In some parts of Africa - such as Ethiopia - the population growth was already showing signs of falling and stabilising, but in many other regions there would continue to be population growth for some years. Any intervention must be based on a sound economic and social analysis, or resources would be wasted.

Climate change will affect Africa more significantly than other areas because of its poverty (allowing fewer choices), its lack of resilience because of poor soils, agricultural practice, and dependence on agriculture. All crops except possibly rice are likely to suffer reduced yields through the effects of climate change, but some areas will suffer more than others. Because Africa is already a low carbon emitter per head of population, it should be easier to mitigate the effects than in other areas, but many renewable technologies will not be available for use in Africa except for solar. The take up of new technologies in Africa can be surprisingly rapid (e.g. the ubiquitous mobile phone). The ability for rapid innovation in Africa should not be underestimated.

Many African states are moving into middle income status. But their ability to stabilize and expand that status depends on their ability to train and expand their professional and technological corps. Africa is well behind the developed countries, Latin America and Asia in the percentage of scientists, engineers, doctors and other trained personnel in their populations. This lack of trained personnel could hold back the development and use of science and technology, which would reduce poverty and encourage positive demographic change. Fortunately there are several African leaders who understand the problem and are progressing change.

Summarizing PROFESSOR WHITTY said that science can provide some of the solutions which will help Africa deal with the problems of the future. But, he warned, beware of hype - there is no silver bullet - many small improvements will be better than dreaming of "breakthrough" technologies; African states needed to understand the implication of the shortage of scientists and technicians; acknowledge the importance of private sector investment and deployment and most importantly undertake scientific research programmes matched to the problems to be solved. The states should beware of researchers looking for a problem for which their results might apply.

In the following discussion, speakers asked whether the scientists and technicians that Africa clearly needs could come from Africa's own resources, or whether they needed to come from elsewhere. The answer was that both were needed. Certainly greater efforts must be made to improve indigenous sources of expertise, but it would take time for that to become effective. Meanwhile help from the rest of the world to do research, improve deployment

and understand the economics was essential. Moreover, it would take a long time to train indigenous professionals to the standards we (and this included China, and Latin America) would think adequate for good research. The state of African education, from primary schools to post graduate work in universities was poor relatively to other states, and a crucial challenge must be to improve it in order to develop the cadre of professionals so essential for progress to be made.

Speakers also questioned the scale and appropriateness of UK development funds, compared with the large investments being made by China in Africa. The UK saw no problem in working with the Chinese, nor with any other country or company which was investing in Africa. Scalability was a problem, and there would always be uncertainty about whether a particular initiative could spur similar efforts elsewhere. But, provided aid was based on a rigorous economic analysis - and UK aid was - it must help.

Speakers noted the success of the rinderpest campaign, and asked whether there were lessons to be drawn from successful interventions such as this compared with others, which had not been as successful as the initial expectations had hoped for. It was not easy to draw general conclusions about why some interventions were more successful than others; there were bound to be both success and failures, but the factors governing them were likely to be particular to individual projects. Undoubtedly, some failures were because insufficient account had been taken of social science questions and research into the ways local populations would understand and react to projects. But a general conclusion that could be drawn from the rinderpest work was the importance of concentrating on a single discrete issue and carrying it to a conclusion. There was a danger, in looking at multiple health and agricultural issues of developing a scatter gun approach, which dissipated effort.

Speakers also raised the problems of increasing urbanization in Africa, and the still low status of women. Urbanization would change the relative importance of some projects, but not the need to increase the productivity of the land. The low status of women was of great importance in holding back development, but not one capable of easy or early solution, given the nature of some African cultures.

Sir Geoffrey Chipperfield KCB

Web links relevant to the debate:

Action Aid
www.actionaid.org.uk

continued on the next page

British Academy
www.britac.ac.uk

Department for International Development
www.dfid.gov.uk

Economic and Social Research Council
www.esrc.ac.uk

Engineering and Physical Sciences Research Council
www.epsrc.ac.uk

Engineers Without Borders UK (EWB-UK)
www.ewb-uk.org

The Foundation for Science and Technology
www.foundation.org.uk

London School of Hygiene and Tropical Medicine
www.lshtm.ac.uk

Oxfam
www.oxfam.org.uk

RedR
www.redr.org.uk

Research Councils UK
www.rcuk.ac.uk

Safe the Children
www.safethechildren.org.uk

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