

Making the most of science and innovation in Overseas Development Programmes

Date and Location:	14th December, 2016 at The Royal Society
Chair:	The Earl of Selborne GBE FRS, Chair, The Foundation for Science and Technology
Speaker:	Professor Charlotte Watts FMedSci Chief Scientific Adviser and Director, Research and Evidence Division Department for International Development
Respondents:	Jon Ridley Head M-KOLA Labs, M-KOLA Solar Rowan Douglas CBE Chief Executive, Capital, Science & Policy Practice and Chair, Willis Research Network, Willis Towers Watson
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PROFESSOR CHARLOTTE WATTS emphasised that rigorous science and innovation were critical for good development. Some of the most beneficial development successes had come from scientific advances – mass vaccinations and the green revolution were only two examples. Largely because of science, hunger had reduced significantly, infant mortality had more than halved in the poorest countries, and mortality from HIV/AIDS had declined substantially.

Development policy now faced a broad range of challenges:

- The impacts of conflict
- Population growth – the global population was now projected to be some 8.5 billion by 2030

- Urbanisation, with the global population of cities rising to around six billion in coming decades
- Rising poverty and inequality in the most fragile, conflict-affected countries
- Climate change and increasingly frequent extreme weather events
- Migration pressures
- Tropical diseases, including ones in the news like Ebola and the Zika virus, and the wider range of neglected diseases
- Continuing gender inequality, in a world where one in three women faced physical or sexual violence at some time in their lives
- The growing threat from resistance to basic drugs – progress on malaria could be reversed for example.

Against this background, the government's

overall Official Development Assistance (ODA) strategy had four cornerstones:

1. Strengthening global peace, security and governance;
2. Increasing resilience and response to crises;
3. Promoting global prosperity;
4. Tackling extreme poverty and helping the world's most vulnerable people.

In all departments spending ODA money, there was a strong commitment to rigorous, operationally-focused evidence to underpin spending decisions. To this end DfID had just announced the results of a far-reaching research review. £390 million per year would now be spent to help tackle the most pressing problems. More research funding would be allocated to the following priority areas:

- Infectious diseases
- Humanitarian innovation (funding would be doubled)
- Education (funding would be trebled)
- Climate change, energy and water
- Migration, cities and adolescents (particularly the links between them)
- The Middle East and North Africa region

There would be a focus on capacity building to encourage research and support knowledge systems in developing countries, to help them find their own solutions. There would also be a new emphasis on joined-up agendas and policies across the government departments concerned, some of which had research funds of their own.

In choosing priorities, DfID gave particular emphasis to the following criteria:

- practical impact on an important development challenge
- addressing gaps in research, for example women and sexual violence
- high quality of research
- deliverability within a realistic, near-term timeframe
- potential for a high return on investment

Professor Watts illustrated DfID's approach with examples from three different areas.

Science for emergencies

During the Ebola crisis, a multi-disciplinary research project basing itself on epidemiological evidence had tested in Guinea the effects of a vaccine developed by Merck, finding that contacts of existing cases who had

been vaccinated immediately had not developed the disease, while significant numbers of those given the vaccine 21 days later had developed Ebola. This had been part of an effort to find responses which could have a real impact on the trajectory of the epidemic while still attracting local support.

In response to the consequences of El Niño in 2015/16, satellite data had been used to support innovative, forecast-based decision-making, allowing £200 million to be mobilised to provide early support to more than 4 million people likely to be affected. In Somalia, early river bank reinforcement activities had prevented flooding of many hectares of productive land. Weekly El Niño monitoring reports had been shared with international partners, and country-level contingency plans had been drawn up in areas like humanitarian assistance, social protection, fighting water-borne disease and improving household resilience.

Rigorous evaluation of innovative interventions

In Rwanda, a large-scale nudge experiment had been carried out to test the reactions of potential taxpayers to negative or positive messages delivered in varying ways. The consequent decision to use positive text messages had improved tax compliance by around 20%. This would now be tested in other countries too.

In Peshawar in Pakistan, scientific testing of the effectiveness of different but relatively simple interventions to help those psychologically affected by the impact of conflict and violence had enabled the best methods to be identified. These results could now be applied elsewhere, bearing in mind that currently more than 125 million people around the world were directly affected by armed conflict.

Using digital methods to create impacts at scale

This was an area of particular excitement for DfID. They and their implementing partners had played a key role in scaling up financial services provision in East Africa through the funding of research in 2001 into how mobile phones could be used to make payments, and subsequent work with innovative local mobile companies. The M-Pesa platform had been established in 2005 and was now used by more than two thirds of Kenyan adults, involving more than 20 million transactions per day. A more recent development in mobile banking, M-Shwari, had also been established with DfID help.

This was an area where one digital platform could quickly lead to others. Mobile money had for example been used to scale up access to solar products: DfID had worked with various partners to set up pay as you go systems such as M-Kopa in Kenya, which enabled rural families to acquire solar power equipment. More than ten new off-grid household solar technologies were now improving the lives of over 3.3 million people. Creation of new enterprises in these areas could result in 120 million African households switching from kerosene to solar lighting, saving them some £9 billion per year. DfID research meanwhile continued to push the boundaries to make use of the links between mobile money and service provision in areas like water and sanitation as well as energy.

A partnership had also been launched with academics at Sussex University to source and implement cutting-edge technologies, including the establishment of a Frontier Technology Hub to manage matchmaking between DfID advisors and innovators and technology entrepreneurs. Partnerships were increasingly crucial. All DfID country offices were now being routinely asked if new technology ideas could help them and their partners. For example, the idea of using airships or drones to deliver aid was being looked at, and could have a considerable impact. Pilot projects were being established.

Professor Watts concluded by underscoring the message that science and innovation were critical for development. UK development aid was now supporting high quality research efforts in these areas, and seeing multiple examples of high impact results. Investments were increasingly being made in digital, big data and other new technologies. Flexibility and agility to respond to new challenges quickly were also vital.

JONATHON RIDLEY who had just returned from a visit to remote customers in East Africa, was the first respondent. Those benefitting from the service were delighted by their experience, but the fact was that 600 million people in rural Africa still had no access to clean energy. 20% of their meagre incomes went on kerosene for lighting and cooking, with the price of kerosene up to 70% higher than in the towns. Kerosene was in any case a very unhealthy

and risky fuel. M-Kopa could provide a piece of solar equipment worth \$250, able to power lighting, radios and other equipment, for a deposit of only \$30. The rest could be repaid over time using mobile money, very flexibly and in very small amounts – less than the family had previously been spending on fuel. Repayment rates were so far impressively high even though 80% of customers earned less than \$2 per day – there was a sanction in that the equipment could be turned off if repayments were not kept up. The practical results were very positive in terms of all kinds of domestic activities, including children studying at night. Once the balance had been paid off, the credit could be reloaded to buy other equipment such as fuel-efficient stoves.

While M-Kopa was a commercial enterprise, all this had been made possible by the willingness of DfID to fund the research and take risks, for example on the likelihood of poor households being able to manage their cash in the ways required. Studies were now under way to measure more accurately the impact of M-Kopa. He was confident that they would be positive – previous studies on the impact of M-Pesa had concluded that it had lifted 2% of the population of Kenya out of poverty, and had a particularly positive effect on women-headed households.

ROWAN DOUGLAS was the second respondent. He commented that it was remarkable how much structural change was now coming through institutions like DfID and the World Bank, because of the way they were bringing together different communities and breaking down boundaries, including those between science and development on the one hand and insurance on the other. Science could have a huge impact on all areas of how business was done, not least in modifying the risk element in decisions on how to allocate capital. Sensible decisions could no longer be made without proper scientific input. For example, the re-insurance sector had gone from ruin to resilience by applying scientific judgments to their activities in financial markets. He underlined the importance of institutions in the international policy area for creating an organising framework for both society and industry. The insurance development forum was for example helping create mechanisms which

would allow further scientific research to be effective. Understanding risk could create resilient platforms for human dignity. DfID's leadership was vital in all this.

DISCUSSION

In the ensuing discussion period, there was much interest in how local innovation in Africa could be encouraged more effectively. DfID were thinking about this and looking to see how seed money might be applied most effectively. One barrier might be the tendency for too many local scientists in African countries to be sucked into government roles, rather than into research institutions (though having scientists in government also had its advantages). In any case DfID was interested in investing in academic institutions to help develop local skill-bases. Meanwhile organisations like M-Kopa were effectively training up a new generation of entrepreneurs who could run big companies themselves in the future.

On a more micro level, could M-Kopa-financed purchases of equipment such as water pumps and food processing machines be raised to the community level? The response was that, while the focus so far had been on individual domestic demands, there was an interest in looking more widely, for example at whether M-Kopa financed projects could compete with mini-grids. However the poverty of the communities where M-Kopa was working was a limiting factor. It was not clear what a successful business model would actually look like. Could some of the equipment be made in Africa, rather than in, say, China, to help create jobs where they were most needed? This could be achievable over time, but major investments would be needed.

The issue of corruption and ineffective local financial systems was raised by several questioners. As long as these were present in so many African

countries, and implementation of ideas was so poor, there could be any number of good-sounding projects but progress in the real world would continue to be very limited. Research into how to construct genuinely effective local financial models might therefore be well worthwhile. DfID was looking at this, and had for example studied how delivering cash directly to communities in India using digital methods could have a hugely beneficial effect because the money was not able to stick to the usual intermediary fingers.

There was also interest in the extent to which government ODA spending might fund more fundamental research, as well as projects focused on practical effects on the ground. However it was clear that ODA spending had to be directed towards benefit for the poorest people in the world, and was therefore inevitably mostly downstream. There was plenty to do in this area. Other government scientific spending could be used in more upstream areas. Questions were also raised about whether government ODA research spending was really as joined up as had been suggested, despite renewed efforts to bring together different government departments.

Were there cultural barriers in some fields, such as engineering, discouraging people from going into research into development issues? This might be so, but it was hoped that the academic community as a whole would recognise the great opportunities there now were for good research in development, given the availability of significant new funding. Excellent science was genuinely needed, and research results could make a huge difference to the world. New partnerships were also required, and were beginning to materialise, including with institutions like Innovate UK. The overall prospects were therefore exciting.

Sir John Holmes GCVO KBE CMG

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