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## A Social License to Undertake Research

The virtuous circle of geological research as an aid to development in Africa

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*Participants and instructors at the 2013 Structural Geophysics course held at the University of Ghana, Legon. Education and other capacity building activities tied to research work can represent a significant contribution to the development of social and economic infrastructure in host nations. Author Mark Jessell is at the right of the back row.*

Modern research science is a capital-intensive industry. Scientific resources and agencies are concentrated in wealthy developed nations with the economic and infrastructure base to support such fundamental endeavours. Nature, however, respects no such distinctions – and we commonly find ourselves attracted to work in politically and culturally diverse regions of the globe.

Indeed geology, perhaps more so than many fields of human enquiry, transgresses the boundaries we impose on the global landscape. The grinding tectonic engines at the heart of our active planet respect no political doctrine, and if we profess a desire to understand the nature of geological processes and trace the record of Earth history, we must be prepared to follow that intellectual path wherever it may lead us.

This is certainly true for the authors' experiences in the fields of structural geology and tectonics. A huge volume of research in this area – with a good proportion of our recent careers included – takes place in developing countries. Such research is often carried out under a banner of international collaboration, with explicit and implicit promises of value delivered to the host nation – although these outcomes are rarely framed as direct aims of the research.

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The fundamental asymmetry of such collaborative relationships raises a significant moral question for researchers working in developing countries – what is our responsibility to the organisations, individuals, and societies with which we engage?

How can we ensure that the scientific and personal benefits derived from global engagement are shared equitably with our hosts?

The answer to these questions may lie in an awareness of the broader implications and corollary benefits of scientific work – and specifically its function in facilitating economic and social development.

Despite its wide (and fluid) use in the language of international political relationships, there is no single metric for what is meant by ‘development’. There is a clear intention that the term reflects positive improvements in a society, but less universal acceptance of exactly what this means. By any of a range of commonly accepted definitions, however, such improvements could include social conditions, education, health, gender equality, the form and stability of government, and other factors in various blends – many of which may be impacted by academic engagement and scientific research.

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*A mosque in the village of Bani, eastern Burkina Faso. Photograph used courtesy of David Baratoux, Paul Sabatier University – Toulouse.*



At an elementary level, scientific discovery itself can represent a significant contribution to economic and social infrastructure. In the tectonically active regions in which we commonly work, such practical elements of enhanced understanding could take the form of hazard identification and risk assessment. In the African context, this translates into studies of seismic activity in North Africa and the East African Rift, for example, or active volcanism in Cameroon.

Although unquestionably significant for the safety and stability of population centres and infrastructure, such fundamental scientific insight is commonly not a first order priority in developing countries with many competing social and budgetary demands, or is outside the resource capabilities of state agencies to acquire. Sharing of data and results from externally funded research in such areas can thus represent a considerable social good. Significant scientific and developmental goals can be met side by side.

More immediately tangible economic benefits are also derived from the processes of geoscience data collection, synthesis and delivery. Common examples of this type of benefit can be found in national-level projects for the acquisition and improvement of pre-competitive geoscience databases – often pursued in particular with the aim of increasing inward investment in minerals exploration. Major development agencies including the World Bank and the European Union – as well as many bilateral aid programs – have supported such country-wide airborne geophysical surveys and geological mapping programmes in developing regions of Africa in recent years.

Typically structured as collaborative projects between a European or North American geological survey and the department of mines or geological survey of a host nation or nations, such mapping programmes have, perhaps somewhat ironically, resulted in much of Africa having higher resolution geophysical data publically available than large parts of Europe. Although acquired with the driver of economic development and investment, these programmes afford significant scientific benefit, with such resources allowing a

level of large-scale tectonic analysis not possible in many parts of the world – even if this is counter-balanced by often inadequate outcrop density.

Most if not all such programmes are coupled with capacity building activities – training and personal development opportunities provided in, or for students from, the host nation. The beneficial impacts of such capacity building are often striking – especially at the individual level. Many senior staff in both private and public organisations in developing countries have benefitted from training undertaken within and alongside collaborative research programmes, enhancing the capacity of the host nations to efficiently manage their natural and scientific resources.

Such investment in training is not simply an exercise in altruism, however. As colleges in the western world have long been aware, an alumni network can be an incredibly powerful agency. Graduates and associates of training linked to research activities in developing nations commonly come to occupy positions of responsibility – and positive memories and perceived value of educational experiences can represent a manifest aid to the development of working relationships in the long term.

The search for and extraction of resources too – minerals, energy, water – can itself be argued to contribute to development through the investment and employment opportunities it brings. Admittedly, history has shown that resource wealth can prove to be a mixed blessing for developing countries – but on the global landscape there are as many stories of success as of failure. The development outcomes of mineral or oil wealth are principally a reflection of how governments use the money, with resource income acting as an amplifier of the existing quality of administration, rather than an inherently damaging influence on society. Not without reason does the CET’s research portfolio in Africa extend beyond the process of mineral discovery to embrace effective governance and resource management.

This idea of research as a means for advancing social and/or economic development is not new, and more generally there is an acceptance that research programmes will include goals of broader societal impact, including



Getting close to the outcrop at the SEMAFO Samira Hill deposit, western Niger. Managed appropriately, both the search for and development of mineral resources can contribute significantly to development goals. Photograph used courtesy of David Baratoux, Paul Sabatier University – Toulouse.

associated outreach and training activities. If research organisations can take the lead from industry on this issue, then perhaps it is appropriate to view such scientific development aid through the lens of Corporate Social Responsibility: this should not simply be a peripheral philosophy we append to our mission statements, but a core element of a positive and successful long term business model framed in terms of a social license to undertake research.

Beyond the anecdotal views of two scientists though, can well-framed collaborative research engagement be shown to effect real positive change in the regions and societies it touches? The question is undoubtedly challenging - even in more developed countries the link between research and national good is hard to establish. In developing countries that face fundamental challenges in terms of health, governance and education, it is a brave soul that defends a claim to explicit evidence of the long-term development benefits of research – and as geologists rather than social scientists or anthropologists, we are ill-equipped to measure these intangible factors.

Certainly, that is no reason to believe such claims are untrue or unwarranted – but as scientists, we are compelled to

seek more than an absence of disproof to support our arguments.

Some well publicised recent critiques have vigorously questioned the practical utility of economic aid as a development tool, and even gone further to suggest that aid is perhaps not only ineffectual, but actually becomes an unintended barrier to development (Easterly, 2006, *'The White Man's Burden'*, Penguin, 440pp; Moyo, 2009, *'Dead Aid: why aid is not working and how there is a better way for Africa'*, Allen Lane, 188pp). These widely cited works however are primarily referencing government-level support, rather than the more direct engagement and tangible research outputs discussed here.

A more appropriate evaluation is perhaps to be found in the work of Reedman and co-workers (Reedman et al., 2002, *'The value of geoscience information in less developed countries'*, British Geological Survey Commissioned Report CR/02/087N, 43pp.) which deals directly with the geoscience context. Reedman et al. support a position that the collection of geoscience data in itself provides an explicit form of development with long term benefits to the studied region.

Perhaps, like fictional FBI agent Fox Mulder in the long running 'X-files' TV series, we just *want* to believe – but we are convinced by Reedman's argument. The inherent nature of science as a collaborative and open venture lends itself to the agency of encouraging and facilitating development – and better understanding of local geology is of long-term benefit to any nation

Researchers are used to justifying their activities to funding agencies and oversight committees with reference to externalities including bioethics and broader societal impacts. In the future we may see the moral and social implications of globalised research carried out in other countries held up to the same standards. Certainly, many of the people with whom we have worked in developing countries over the years would welcome such a test, as it would enable them to be rewarded for the often challenging conditions of their work and the effort expended to build and maintain collaborative research programmes in many fascinating but logistically and culturally challenging areas of the world.

## FURTHER READING

*A partial overview of geological research programmes as a contribution to development aid can be found in Kay et al., 2013, 'Assessment of mineral potential, geoscience survey capacity, risk, and geological aid in Africa, Asia, Latin America, and the Pacific.'* Record 2012/64, Geoscience Australia: Canberra.

*The value of these programmes in terms of supplying extremely valuable fundamental datasets is undeniable, and their application to development in the African Context is discussed at length in Ovidia et al., 2012, 'Geodata for Development, a Practical Approach' in [www.eisourcebook.org](http://www.eisourcebook.org).*

## AUTHOR INFORMATION

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