

Conference Report

Geological aid to developing countries

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Report of the inaugural meeting of the UK section of the Association of Geoscientists for International Development (AGID-UK), now affiliated to the Geological Society, held in Burlington House, 15 February 1988.

AGID is a unique international association of geoscientists with some 90% of its 2500 membership drawn from over 100 Third World countries. After nearly 15 years in existence, it is still the only organization devoted to the application of science to the problems of developing countries. It works in co-operation with local, national and international groups on programmes related to the development of natural resources, environmental planning and geoscience education. Perhaps its most important function is the informal grassroots contact and worldwide collaboration between individual geoscientists who share many of the same problems and the determination to solve them.

The theme of the meeting was to explore the role that UK geologists could play towards these ends. Four speakers were invited to address aspects of 'geological aid' from personal experience.

Global geoscience. **Anthony R. Berger** (Ottawa, editor of *Episodes*) began by suggesting that 'geological aid' was a somewhat outmoded concept. However since geosciences are global in outlook, it is imperative that a proper understanding is developed of the natural forces that lead to global changes and of their interaction with society. It is also imperative to communicate effectively both the results of such research and any consequent warnings to planners, politicians and policymakers. None of this can be done without the full participation of Third World Scientists in the scientific mainstream. 'Geological cooperation', rather than 'geological aid' then, is essential to the future of our science and society.

He said the International Geological Correlation Programme (IGCP) has been enormously successful since its inception 15 years ago, having produced an estimated 20 000 publications with the involvement of thousands of geoscientists worldwide. The International Union of Geological Sciences (IUGS) sponsors and cosponsors many similar activities, for example the International Lithosphere Programme (ILP), and has affiliated to it major regional and international societies such as INQUA for the Quaternary, IAEF for engineering geology, and AGID.

A programme investigating Quaternary climatic change in Africa is cosponsored by INQUA and AGID. Another initiative is the International Geosphere–Biosphere Programme (IGBP) on Global change, which is being developed for the 1990s. This interdisciplinary and international project aims at understanding the patterns of both natural and man-made change over the short term. The

UN has recently adopted a new programme, the International Decade for Natural Disaster Reduction, which will focus attention on earthquakes, volcanic eruptions, landslides, floods, droughts and desertification. It emphasizes the applications of science and technology to the forecasting, prevention and mitigation of natural hazards, in contrast to the more basic academic direction of the Global Change Programme.

That the global approach to geoscience exists is not in doubt, it is the effective communication of our findings and their implications that is lacking. The recent Brundtland Report, *Our Common Future* (1987), is widely regarded as the new dictum for environmental policy makers. However, this 'final report' of the UN World Commission on Environment and Development (WCED) takes into account almost every perspective except that of the physical and earth sciences. Very few submissions to the Commission were made from scientists and only one from geoscientists (IUGS). Although the latter did emphasize the importance of discerning patterns of change, by study of natural variations of the past and so developing a predictive capability for future changes, the text of *Our Common Future* bears little evidence that this message got through to the Commission.

The global programmes of most interest and relevance to the developing countries are 'applied' rather than basic research programmes, e.g. urban planning, natural disasters, water resources, mineral resources and agrogeology. Even within such schemes the full participation of Third World geoscientists is severely hampered in many instances by the conditions under which they have to live and work. The challenge now and for organizations such as AGID, is to improve the level of such participation by, for example, invitations to conferences, planning of meetings in their own countries, assistance with training courses, workshops, educational materials and availability of scientific literature.

University research collaboration. **M. Aftab Khan** (Geology Department, Leicester University) also stressed the importance of achieving sound collaboration with local geoscientists as the best way of ensuring continuation of any aid programme, maintenance of equipment and use of its results. Too often outside experts have not managed to generate sufficient local confidence or enthusiasm and so the follow-on declines after the end of the project. His experiences in Kenya over the past 23 years show how successful collaboration can be. The research aimed to understand the processes involved in the splitting of a continent, and initially carried out a variety of geophysical measurements to investigate deep structure across the rift zone. After ten years of shoe-string research with funds

from Leicester and much local goodwill, a gravity map of the whole of Kenya based on some 10 000 stations, was produced and published by the Geological Survey of Kenya. This later became an important part of the information package prepared by the Government and sold to oil companies considering tendering for exploration licences.

Involvement gradually increased both within Nairobi University and the Survey. At least two postgraduate theses have now been completed in Kenya on the work so far and a further half-dozen are planned. Detailed examination of the residual anomalies in the rift by a UN team who carried out additional surveys, showed an association with recent volcanic activity and present-day thermal highs. As a consequence there is now one producing geothermal power station and considerable active exploration by the Kenya Power Company. Implications for developing geothermal energy have blossomed into a big project involving ten different nations and several Kenyan universities and institutions. There has also been a recent proposal, generated locally, for a Kenyan seismic network, obviously vital for the proper planning of dams, power stations, roads and airports.

Bilateral geological aid. **Anthony J. Reedman** (British Geological Survey, Aberystwyth) spoke of the response and development of the indigenous geological community in the Republic of Korea to its unparalleled growth from a developing to an industrialized status during the past two decades. He examined the changing role of overseas geological aid, mainly official aid via the British Geological Survey, to the changing demands of a rapidly developing economy.

Between 1970 and 1985, Korea has experienced a GNP increase of over 1000%, a per capita GNP increase of over 800% to \$2032 and a rise in the value of exports of 3500%, catapulting itself to become the world's twelfth largest trading nation in 1986. Such rapid expansion has required geological input towards large civil engineering and construction projects, in the growth of mining and quarrying industries to match increased demand for raw materials, in the major development of coal resources following the oil price rises of the early 1970s, in increasing limestone production to sustain growth in cement manufacture, and in the continued production of and exploration for metallic ores.

Although this growth was not anticipated, the geological community has responded well. The basic geological mapping achieved has been enviable; three-quarters of the peninsula has now been surveyed at 1:50 000 scale and a programme of 1:10 000 surveying of selected areas has begun. The Geological Society of Korea and associated specialist groups, have grown significantly, as have the numbers of university undergraduates and post-graduates in geology.

International geological aid, initially German in 1884, then Japanese until 1945 followed by US/UK bilateral and UN multilateral aid, has played an important role in this development. British geological aid, financed by the Overseas Development Ministry (now ODA), begun in 1971, has resulted in a close continuing relationship between the Institute of Geological Sciences (now BGS) and the Korean Geological Survey.

The joint programmes evolved from long-term residential technical co-operation projects to short term technical

projects and consultancies, and finally to the joint research projects and Korean-funded consultancies. The latter now supersede the 'aid' programme as the result of the rapidly developed intellectual and economic resources of Korea. Both on-the-job training in Korea and specialist postgraduate studies at British Universities are probably the most significant aspect of this aid.

Reedman made the interesting final comment that the same major problems currently face the geological communities in Korea and the UK; namely the means of providing the best and most relevant earth science education and the organization and funding of a Geological Survey capable of sustaining and developing a national geosciences database. It will be instructive to compare the Korean and British solutions.

Small-scale mining. **Arthur J. G. Notholt** (Interfos Associates, Uxbridge) spoke as the UK representative and past chairman of the International Geological Correlation Programme No. 156 on phosphorites, which has been an enormously successful example of international collaboration involving many participants from the Third World. Phosphates are so important in developing countries for agricultural fertilizer production that little is exported.

He outlined the concept of 'small-scale' mining in developing countries, which is being recognized as increasingly important for the exploitation of many different mineral resources. With respect to phosphates, small-scale implies an annual production of <100 000 tons, a relatively limited value of output, a relative lack of sophisticated mechanization and hence a greater use of manpower, and there are many which fit this definition. Such operations are economically more viable for countries with limited resources than for major mining ventures that commonly involve some kind of 'partnership' with a large foreign multinational corporation. In small-scale mining, the raw material, its processing and refinement, and the profits are likely to remain in the country concerned. Effective geological aid in small-scale phosphate mining is achieved by both major global geoscience schemes (IGCP Project 156) and 'small-scale' consultancies.

Discussion: lively and varied discussion followed the four talks. Summarizing the meeting, the chairman and convenor **Dorrik A. V. Stow** identified two basic premises: that the geosciences are important for economic and social development in the Third World, and that the developed countries have much to contribute in terms of geological expertise, methodology and resources. It was also clearly recognized that collaboration on a global scale was essential for the development of the science as well as for the management of our planet. 'Geological aid' of an altruistic donor/recipient nature was becoming outmoded.

Worldwide geoscience collaboration can take place in one of several different ways. (1) University links for cooperative research programmes and education/training schemes. (2) State collaboration, usually between national Geological Surveys, involving basic mapping, on-the-job training resource assessment and exploration. (3) Private-sector involvement ranging from small-scale consultancy, which can produce co-operation and skills-transfer, to major investment by multinational corporations, where the benefits of collaboration are often more arguable. (4) Global geoscience programmes (e.g. UN or IUGS

sponsored) involving developing countries in applied projects of direct relevance to their own development. (5) Other Non-Government Organizations (e.g. national volunteer programmes and aid agencies) involving secondment of qualified personnel, assistance with geoscience projects and training schemes. (6) Finally, individuals participating in geological collaboration, especially via the growing international network of geoscientists within AGID.

We must not be complacent on the many past or present effective projects. Now is the time for constructive critical assessment of UK geological collaboration overseas. This might be most effectively addressed during and after the International Conference on Geosciences in Development which is to be held at Nottingham University in September 1988. A few questions might be raised to help start that discussion. (1) How can we ensure that research collaboration overseas *does* involve collaboration on an equal basis with local geologists? (2) Is the overall provision in the UK for overseas training, MSc and PhD postgraduate study, adequate in terms of the options available? Are UK Universities losing-out on the mutual benefits of collabora-

tion by charging high fees to overseas students? (3) Are the resources available from the Overseas Development Administration to the BGS for 'aid' projects sufficient? Do overseas projects aim for collaboration rather than 'aid', give adequate training and ensure that effective projects are followed up after the initial phase? (4) Can private sector involvement overseas, both small-scale consultancy and large-scale multinational, be controlled to ensure mutual benefits? (5) What measures can be taken to direct global geoscience programmes to the needs of developing countries and to facilitate equal participation of geoscientists? How can the problems of scientific literature distribution and attendance at international meetings be overcome?

In many developing countries the geological community must strive to make politicians and decision-makers aware of the relevance of the geosciences to national development. The UK also faces the challenge of increasing public and political awareness of the inherent importance of this subject. It is time we showed greater collaboration with Third World colleagues in stressing the mutual benefits and potential of international geoscience.

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