by A J Reedman

Geoscience and development—the role of AGID

Introduction

Geoscience is concerned with the materials and morphology of the solid earth and the physical and chemical processes which have acted, and continue to act, within and upon it. Every country, whatever its state of economic and social development, is the guardian of its own unique sector of the earth's crust beneath its national territory and which, both literally and metaphorically, forms the foundation of its national economic planning and development. It is the source of each nation's mineral, energy and groundwater resources. Its interaction with the biosphere, hydrosphere and atmosphere determines the character of the nation's soils and their content of both essential and toxic trace elements. Its internal structure, dynamics and morphology govern the distribution of natural geohazards such as volcanoes, earthquakes and landslides. Data which collectively describe all the above comprise the national geoscience knowledge base.

The task of assembling, archiving and distributing this geoscience information is normally a public sector activity, assigned to a national geological survey organisation (GSO) which provides a national geoscience information service, underpinning many different economic activities. Geoscience information and trained geoscientists are fundamental to the following.

- The identification, quantification, extraction and beneficiation of **mineral and energy resources**; all potentially of substantial developmental importance and probably involving the greatest numbers of individual geoscientists. It is here that the question of sustainability in development is most commonly raised and geoscientists need to be engaged in developing an understanding of the mechanisms of sustainability.
- The provision of **clean drinking water**. Much of the world's supply is derived from groundwater and its discovery, exploitation, protection and management all require the input of geoscientists. The impact of rapid urbanisation and the potential for declining groundwater quality in urban areas are current topics of particular concern.
- The study of **geohazards** is a further area of geoscience of crucial importance to many developmental activities. Geohazards, both natural and anthropogenic, not only threaten the health and welfare of a nation's population, but can cause, both directly and indirectly, immense disruption to productive capacity and hence to wealth creation. They embrace a broad spectrum of phenomena the most popularly recognised of which are earthquakes, volcanic eruptions and landslides. There are also, however, numerous other hazards, some entirely natural, others involving human activity, which require geoscientific investigation for their proper understanding and for the development of mitigation strategies. These include ground subsidence due to mineral or groundwater extraction; coastal erosion; chemical contamination of soils, surface and groundwaters by industrial activity, waste disposal and mineral extraction; and trace element excesses or deficiencies in soil and groundwater due to local variations in natural trace element abundance. Some, or all of these geohazards will affect every developing country and a proper appreciation of their mechanisms and distribution, together with the risks and geographical vulnerability, they pose is essential to appropriate land-use and development planning.

In the early 1970s, a small group of geoscientists from both developed and developing countries, held a series of discussions to

consider mechanisms for promoting the role of the geosciences in economic and social development by providing more information to the geoscientific community; by encouraging a dialogue between geoscientists in the developing countries and their counterparts in the so-called 'developed world', and by giving practical help to individual development initiatives involving geoscientists. The outcome of their efforts was the formation, in 1974, of the Association of Geoscientists for International Development (AGID) which over the last two decades has enrolled the support of almost 2000 individual and institutional members from over 120 countries, making it a unique worldwide network of geoscientists dedicated to exploring and promoting the role of geoscientists in sustainable development. The primary objectives of AGID are:

- the encouragement and facilitation of communications between geoscientists in the developed and developing countries;
- the transfer of geoscientific information and knowledge, relevant to sustainable development, between individuals, agencies, corporations and societies, and
- the promotion of geoscientific activities appropriate to the needs of developing countries.

AGID works to achieve these aims by:

- the maintenance of a worldwide membership network centred on the AGID Headquarters;
- the publication of an international journal (*Geoscience and Development*) and support for regional newsletters;
- support for appropriate geoscience projects and workshops mainly initiated by AGID members, and
- the provision of scholarships to assist postgraduate students in developing countries to complete necessary fieldwork.

The AGID worldwide network

AGID is a non-governmental organisation, affiliated to the International Union of Geological Sciences. It is governed by a Council of 20 members, elected every four years. The Council elects a President, Secretary-General, Treasurer and five Regional Vice Presidents and these officers constitute the Executive Committee. All Officers and Councillors work on a purely voluntary basis, often with considerable support from their employers. The Councillors are all drawn from different countries and are required to meet every four years in conjunction with the International Geological Congress and at least once in the intervening period. The dispersed nature of the organisation, however, makes it essential to maintain a headquarters office which is central to the communication with the worldwide network of AGID members. The office is run by AGID's only two employees, a part-time Executive Officer and an Administrative Assistant. They maintain the communication link between Members, the Council and Executive Committee, channel all enquiries, comments, project proposals and other communications to the appropriate destination and maintain all AGID records and membership data. The office is situated in the Institute of Geosciences of the University of São Paulo, Brazil, and the University provides the office accommodation and some support services free of charge, a fact that is greatly appreciated by an organisation with very limited financial resources.

Financing a network such as AGID, as all readers associated with voluntary organisations will know, is a continual struggle.

by A J Reedman

Geoscience and development—the role of AGID

Introduction

Geoscience is concerned with the materials and morphology of the solid earth and the physical and chemical processes which have acted, and continue to act, within and upon it. Every country, whatever its state of economic and social development, is the guardian of its own unique sector of the earth's crust beneath its national territory and which, both literally and metaphorically, forms the foundation of its national economic planning and development. It is the source of each nation's mineral, energy and groundwater resources. Its interaction with the biosphere, hydrosphere and atmosphere determines the character of the nation's soils and their content of both essential and toxic trace elements. Its internal structure, dynamics and morphology govern the distribution of natural geohazards such as volcanoes, earthquakes and landslides. Data which collectively describe all the above comprise the national geoscience knowledge base.

The task of assembling, archiving and distributing this geoscience information is normally a public sector activity, assigned to a national geological survey organisation (GSO) which provides a national geoscience information service, underpinning many different economic activities. Geoscience information and trained geoscientists are fundamental to the following.

- The identification, quantification, extraction and beneficiation of **mineral and energy resources**; all potentially of substantial developmental importance and probably involving the greatest numbers of individual geoscientists. It is here that the question of sustainability in development is most commonly raised and geoscientists need to be engaged in developing an understanding of the mechanisms of sustainability.
- The provision of **clean drinking water**. Much of the world's supply is derived from groundwater and its discovery, exploitation, protection and management all require the input of geoscientists. The impact of rapid urbanisation and the potential for declining groundwater quality in urban areas are current topics of particular concern.
- The study of **geohazards** is a further area of geoscience of crucial importance to many developmental activities. Geohazards, both natural and anthropogenic, not only threaten the health and welfare of a nation's population, but can cause, both directly and indirectly, immense disruption to productive capacity and hence to wealth creation. They embrace a broad spectrum of phenomena the most popularly recognised of which are earthquakes, volcanic eruptions and landslides. There are also, however, numerous other hazards, some entirely natural, others involving human activity, which require geoscientific investigation for their proper understanding and for the development of mitigation strategies. These include ground subsidence due to mineral or groundwater extraction; coastal erosion; chemical contamination of soils, surface and groundwaters by industrial activity, waste disposal and mineral extraction; and trace element excesses or deficiencies in soil and groundwater due to local variations in natural trace element abundance. Some, or all of these geohazards will affect every developing country and a proper appreciation of their mechanisms and distribution, together with the risks and geographical vulnerability, they pose is essential to appropriate land-use and development planning.

In the early 1970s, a small group of geoscientists from both developed and developing countries, held a series of discussions to

consider mechanisms for promoting the role of the geosciences in economic and social development by providing more information to the geoscientific community; by encouraging a dialogue between geoscientists in the developing countries and their counterparts in the so-called 'developed world', and by giving practical help to individual development initiatives involving geoscientists. The outcome of their efforts was the formation, in 1974, of the Association of Geoscientists for International Development (AGID) which over the last two decades has enrolled the support of almost 2000 individual and institutional members from over 120 countries, making it a unique worldwide network of geoscientists dedicated to exploring and promoting the role of geoscientists in sustainable development. The primary objectives of AGID are:

- the encouragement and facilitation of communications between geoscientists in the developed and developing countries;
- the transfer of geoscientific information and knowledge, relevant to sustainable development, between individuals, agencies, corporations and societies, and
- the promotion of geoscientific activities appropriate to the needs of developing countries.

AGID works to achieve these aims by:

- the maintenance of a worldwide membership network centred on the AGID Headquarters;
- the publication of an international journal (*Geoscience and Development*) and support for regional newsletters;
- support for appropriate geoscience projects and workshops mainly initiated by AGID members, and
- the provision of scholarships to assist postgraduate students in developing countries to complete necessary fieldwork.

The AGID worldwide network

AGID is a non-governmental organisation, affiliated to the International Union of Geological Sciences. It is governed by a Council of 20 members, elected every four years. The Council elects a President, Secretary-General, Treasurer and five Regional Vice Presidents and these officers constitute the Executive Committee. All Officers and Councillors work on a purely voluntary basis, often with considerable support from their employers. The Councillors are all drawn from different countries and are required to meet every four years in conjunction with the International Geological Congress and at least once in the intervening period. The dispersed nature of the organisation, however, makes it essential to maintain a headquarters office which is central to the communication with the worldwide network of AGID members. The office is run by AGID's only two employees, a part-time Executive Officer and an Administrative Assistant. They maintain the communication link between Members, the Council and Executive Committee, channel all enquiries, comments, project proposals and other communications to the appropriate destination and maintain all AGID records and membership data. The office is situated in the Institute of Geosciences of the University of São Paulo, Brazil, and the University provides the office accommodation and some support services free of charge, a fact that is greatly appreciated by an organisation with very limited financial resources.

Financing a network such as AGID, as all readers associated with voluntary organisations will know, is a continual struggle.

Table 1 AGID membership fees (in US\$).

	Developed country	Developing country
Individual (Annual)	20 pa	5 pa
Individual (Life)	200	100
Institutional Member	100 pa	50 pa
Supporting Member	500 pa	250 pa

Because of its very nature, with a majority of its members in developing countries, AGID attempts to keep its membership dues as low as possible and operates a dual system of subscription rates with the higher rates applying to members in developed countries (Table 1). For those who can afford no subscription at all, AGID will accept 'in-kind' contributions such as publications, articles for the AGID journal or general support in helping to organise AGID's local activities. Where there are difficulties in remitting individual subscriptions to AGID headquarters due to currency restrictions, these may be collected by AGID's national representatives and used for local projects within the country concerned. In this way a number of developing countries have formed national AGID sections which are essentially self-supporting. Membership dues are not sufficient to finance all AGID's networking and project activities and the organisation relies on sponsorship. For some 20 years, the Canadian International Development Administration (CIDA) provided a grant to AGID both to assist its networking operations and provide funds for approved projects. The IUGS also provides a small grant to AGID and the UK Overseas Development Administration has been another important supporter.

A vital document underpinning the AGID network is its Membership Directory which includes all AGID's members names and addresses, listed both by country and by geoscientific discipline or special interest. The directory provides a valuable reference work for anyone wishing to contact geoscientists of a particular specialisation in the majority of the countries of the world. It is constantly updated by Headquarters on a computerised database and it is AGID's aim to reprint the Directory for issue every four years. As part of the AGID network, a system of national correspondents is also operated in order to keep up to date with geoscience development around the world.

AGID publications

The major vehicle for informing members of AGID activities and for discussing, through articles, letters and newsletters, issues concerning geoscience and development, is the AGID journal, *Geoscience and Development*. Originally launched as a newsletter, it has evolved into a more substantial publication issued two or three times each year to all members. It contains a mixture of feature articles, reports on AGID projects, a calendar of events, correspondence, reviews and general geoscience news items. For many of our members in the least developed countries it is the only geoscience journal that they can afford to subscribe to and therefore read regularly, forming a vital link with the worldwide geoscience community. The journal is edited to a professional standard and many people contribute freely of their time to maintaining its standards.

In addition to the journal, AGID promotes other publications and some 21 books have now been published in the AGID Report Series. In recent years, accepting that funds are not available for AGID to publish independently, AGID has had to arrange for commercial publication of much of its output following which it attempts to raise sponsorship for the purchase and distribution of the resultant books to libraries and appropriate institutions in developing countries. Recent publications are listed below. In all these cases, the UK Overseas Development Administration provided funds for AGID to purchase 100 copies of each book for free distribution to developing country institutions. AGID may also receive royalties on sales of

such books. A further AGID activity involving publications is the operation of a book and journal donation service aimed at providing much needed geoscience literature to libraries in the developing world. This invaluable scheme is operated on a voluntary basis by hard-working colleagues in Canada and now has charitable status. For more information on the AGID Book/Journal Donation Scheme in Canada please contact: Dr Owen White, 910 Avenue Road Toronto, Ontario, M5P 2K6, Canada.

Recent books in the AGID report series

- Nash H and McCall G J H, eds., 1994, **Groundwater quality**: Chapman and Hall, 224pp.
- Mathers S J and Notholt A J G, eds., 1995, **Industrial minerals in developing countries**: AGID Report Series Geosciences in International Development No 18, British Geological Survey/AGID, 272pp.
- Stow D A V and McCall G J H, eds., 1996, **Geoscience education and training**: A A Balkema Publishers, 876pp.
- McCall G J H, De Mulder E F J and Marker B R, eds., 1996, **Urban geoscience**: A A Balkema Publishers, 225pp.
- Appleton J D, Fuge R and McCall G J H, eds., 1996, **Environmental geochemistry and health**: Geological Society Special Publication no. 113, 264pp.

AGID projects

AGID aims not only to be an information network but also to help launch and sustain practical geoscience projects and events, including conferences and workshops, concerned with sustainable development. As AGID is not in a position to provide large sums of money to fund ambitious projects, it takes upon itself the special and, we believe, valuable role of providing 'seed' money (normally no more than \$5000 per project) to allow the development of projects proposed via AGID channels for further co-funding by other agencies. AGID also provides 'add-on' funds to already viable projects, usually to allow greater participation by geoscientists from the least developed countries. It is worthy of note that, adopting the 'seed' money technique, in 1995 for example, some 66 institutional and business sponsors from both the public and private sectors supported projects which AGID helped initiate and their total cash contribution was approximately \$300 000, compared with an AGID cash input of some \$30 000.

In the decade between 1985 and 1995, AGID either initiated, organised or co-sponsored 175 individual projects comprising 73 in Asia, 28 in Africa, 49 in Latin America and 20, mostly conferences, in developed countries. The following review of the 1995 programme gives an idea of the range of these activities.

- In Africa support was given to the Geological Society of Africa to help organise and mount their bi-annual conference in Nairobi. The meeting itself was very successful but, even more significantly, a new Council elected at the meeting, with Dr Sospeter Muhongo (an AGID Councillor) as its president, is revitalising the organisation, a fact that will have considerable impact on the geosciences in Africa. AGID hopes to further help this process with selective support to the GSA in the future.
- Alongside the conference of the GSA, AGID gave a grant to fund an inaugural meeting of African women geoscientists. This resulted in the formation of the Eastern, Southern and Central African Women Geoscientists Group. An interim committee with members from Kenya, Tanzania and Uganda is now identifying projects to further the cause of women geoscientists in the region, the first of which will be a Geoscience Writing Workshop.
- In Zambia, AGID funded the attendance of eight small-worker miners and 16 students at the International Conference on Industrial Minerals in Lusaka. In addition AGID co-sponsored an industrial minerals workshop at the Conference and funded the attendance of three geologists from Uganda, Tanzania and Ethiopia at the workshop. Similarly, assistance was given to

allow printing of an edition of the *Zambia Journal of Applied Earth Sciences* (Vol. 8, no. 1).

- The largest event in Asia during 1995, for which seed money was provided by AGID in 1993 and 1994, was the Second South Asia Geological Congress (GEOSAS II, Colombo, Sri Lanka) attended by 291 delegates from 20 countries. Following advanced funding by AGID some 13 other organisations co-sponsored the event to the extent that partial financial assistance was given to almost half the delegates from the region. The conference was opened by the President of the Republic of Sri Lanka, a fact that did much to raise the profile of both the conference itself and the role of geosciences in development in the region.
- The first of two programmes on Earth Science for Schools was held in Kandy, Sri Lanka, in May 1995. It was attended by 158 participants, made up of 140 senior students and 12 teachers from four schools in Kandy, and six officials from the Department of Education of the Central Province. This programme was organised by the Geological Society of Sri Lanka (GSSL) in association with the Institute of Fundamental Studies (IFS), Kandy, and jointly sponsored by AGID and the IUGS Commission on Geoscience Education and Training (COGEOED). Each day's programme consisted of lectures, a short field class, a video film, a quiz, a panel discussion and, at the end of the day, an awards ceremony.
- AGID support was also given to fund a participant from Pakistan at the 10th Himalaya-Karakoram-Tibet Workshop in Zurich. Planning continued for a workshop on Geoscience and Urban Development in Dhaka, Bangladesh and a Conference on Mining and the Environment in Bandung, Indonesia.
- During 1995, six Geoscience Writing Workshops were held in Asia, one in Sri Lanka, five in India and one in Nepal. These represented the forty second to forty seventh of such workshops carried out by Professor J Cooray on behalf of AGID and COGEOED which have together resulted in the training of over 1200 geoscientists in developing countries, one of AGID's proudest achievements.
- The major AGID-supported activity in Latin America in 1995 was the 1st Inter-American Workshop on Urban Seismology, successfully implemented in August 1995 in Pereira, Colombia. Again the AGID input assisted with the initial organisation costs with subsequent sponsors covering much of the running costs.
- Assistance was also given to Small Mining International (based at McGill University, Canada) who in cooperation with the National Institute of Small Mining in India are setting up an international information system for small mines. The current grant was to allow completion of an easily accessible database of all the reports and documents on small-scale mining currently held by SMI.

Support for students

Students currently studying geoscience in the developing countries represent an important investment in the future application of geoscience to national economic development. However, postgraduate research scholarships are often hard to come by and, with the added cost of fieldwork, undertaking research may be beyond the means of some students. Some years ago, AGID established a fund to assist postgraduate geoscience students in developing countries to carry out fieldwork in connection with their research. In 1993 this was renamed the William Greenwood Memorial Fund. In 1995 a record number of students (32) were supported from the fund and it is clear from the students' letters and reports that this is an important and perhaps, at the personal level, the most appreciated funding support provided by AGID. Short accounts of the students' projects and

research findings are published regularly in *Geoscience and Development* and demonstrate the diversity of applications of geoscience in a developmental context and the enthusiasm of the students.

Partly as a result of the success of the above scheme, the UK branch of AGID has initiated a plan to encourage the twinning of student geological societies at UK universities with student societies at developing-country universities. An account of the proposed scheme in *Geoscience and Development* has resulted in many enquiries and several twinning arrangements have either been initiated or are under discussion.

The future

At a time when funds in many development agencies have been either cut or under review, AGID faces a difficult task in raising funds to realise all its objectives. Membership has risen steadily but our members in developing countries can contribute relatively little in cash-terms and most is kept for national AGID Groups to pursue local activities. At the same time, requests for AGID assistance and services show no signs of abating and with the success of *Geoscience and Development*, our newly titled journal, this is anticipated to continue. Accordingly, the Council of AGID in looking ahead to the next ten years, has reviewed its priorities and has determined that it is of prime importance to maintain the AGID network, assisted by the regular publication of *Geoscience and Development*, followed by the continued support for selected projects and maintenance of the William Greenwood Scholarship programme.

In this way AGID hopes to continue with its modest contribution to promoting the involvement of geosciences and geoscientists in development as spelt out in the Introduction to this article. However, in order to do this we, now more than ever, need your help!

Contact addresses

For further information and membership details please contact:

A J Reedman, Secretary General, AGID
British Geological Survey, Keyworth, Nottingham NG12 5GG, UK
Phone: 44(0)115 9363465; fax: 44(0)1159363474
e-mail: a.reedman@bgs.ac.uk
or

Katia Mellito
AGID Headquarters
c/o Institute of Geosciences, University of São Paulo
CP 11 348 05422-970, Brazil
Phone: 00 55 11 818 4206; fax: 00 55 11 210 4958
e-mail: kmellito@usp.br

Dr A J (Tony) Reedman is the Secretary-General of AGID. He is an Assistant Director and Head of the International Division at the British Geological Survey. His Division manages a large number of Technical Cooperation projects around the world, many in collaboration with geological surveys in developing countries. He has himself worked in a number of such countries and has a particular interest in improving strategies for assisting the geological surveys of developing countries.