

THE DFID KNOWLEDGE & RESEARCH PROGRAMME

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Summary

The paper provides an overview of the applied research undertaken by the British Geological Survey (BGS) under the Knowledge & Research (KaR) programme funded by the UK Department for International Development (DFID). The paper describes the objectives of the DFID strategy in the context of poverty alleviation in the developing world and summarizes projects carried out in the Geosciences and the Water & Sanitation sectors.

Introduction

As part the UK Government's provision of overseas aid, DFID supports a programme of applied research and development under its Knowledge & Research programme. The aim of the programme is to develop technical solutions that contribute to economic growth and poverty alleviation in the developing world in line with the UK Government White Paper on International Development (1997). Actions to achieve this aim fall under three main objectives:

- Policies and actions which promote sustainable livelihoods
- Better education, health and opportunities for poor people
- Protection and better management of the natural and physical environment

Topics covered by the KaR programme extend across a range of engineering sectors including Energy, Transport, Urbanization, Information and Communication Technology, Geoscience, and Water & Sanitation. Projects undertaken by the British Geological Survey fall mainly in the Geoscience and Water & Sanitation sectors. The paper will provide an overview of the research undertaken under the programme highlighting various projects led by the British Geological Survey.

KaR Geoscience programme

The DFID KaR Geoscience sector is directed towards a number of areas related to the productive and environmentally sensitive development of mineral resources, the protection of people from natural and man-made hazards, and more efficient systems for gathering and utilizing geoscience data. It includes the following themes:

Theme G1: Promote environmentally sensitive mineral resource development. Many developing countries are relatively well-endowed with mineral resources, the

exploitation of which can provide income both to individuals and to governments. This is a sector in which many of the world's poorest people, including many women, work. The theme includes small-scale artisanal mining/quarrying operations; the mitigation of environmental impacts associated with mining; and the use of local resources for import substitution. Projects undertaken include:

- Environmental impact of coal-fired power stations
- Procedures for the rapid assessment of limestone resources
- Minerals for development workshops
- Local development of affordable lime in southern Africa
- Effective development of offshore aggregates, SE Asia
- Recovering the lost gold of the developing world

Theme G2: Improve geological, geochemical and geotechnical hazard avoidance strategies in development planning. This focuses on the use of the research results in urban and land-use planning and includes both natural and man-made hazards. Projects undertaken include:

- Secondary seismic hazard assessment
- Geochemistry and toxicity of naturally occurring aluminium
- Volcanic hazard mapping for development planning
- Environmental impact of alluvial tin mining
- Cerium and endomyocardial fibrosis in tropical terrains
- Mitigation of mining-related mercury pollution hazards
- Prediction and remediation of human selenium imbalances
- Environmental arsenic exposure: health risks and geochemical solutions
- Gypsum geohazards and their impact on development
- Treatment of contaminated land using diatomite
- Cost-effective evaluation of hazards from mine waste

Theme G3: Improve the understanding of the engineering properties of geological materials in developing countries and develop new engineering and environmental applications for their use. This theme is intended to promote the use of indigenous supplies of bulk raw materials that will enable new local industries to grow. It includes innovative uses of local materials including methods to assess quality and performance. Projects undertaken include:

- Monitoring moisture in red clay road embankments
- Development of bentonites for use in urban waste disposal
- New hydroponic and construction uses for porous materials

Theme G4: Develop strategies and systems for maintaining and improving national geoscience information services. This theme aims to improve the availability of appropriate geoscience information as part of the national infrastructure. It includes appropriate techniques for geoscience data acquisition, management (including GIS solutions) and analysis, as well as strategies and systems for strengthening geological survey organisations. The use of geoscience information for fragile natural environments, urban, and coastal environments is stressed. Projects undertaken by BGS include:

- Mineral information databases in developing countries
- Geological surveys in developing countries: strategies for assistance
- Geoscience information system for mineral development
- Implementation strategy for landslide hazard preparedness
- Appropriate technology for low-cost geological mapping
- Strategies and systems for maximizing geoscience data value
- The societal value of geoscience information in LDCs

KaR Water & Sanitation programme

The Water & Sanitation sector builds on the principles agreed at the Rio de Janeiro Conference in 1992. It covers a range of themes directed at helping the poor meet their basic needs of safe water for drinking, for food production and improved sanitation. Specifically, it seeks to: (1) improve the assessment, development and management of water resources; (2) combat degradation and increase protection of water resources, water quality and aquatic eco-systems; and (3) raise the well-being of the rural and urban poor through cost-effective improved water supply and sanitation. The themes and areas of work identified for this sector support this integrated approach.

Theme W1: Improved assessment, development and management of water resources. This includes the improved capture, processing, synthesis and dissemination of water resources data; improved water resources assessment and forecasting; improved planning of water resources development and management; better planning for change and uncertainty; and better institutional and operational

solutions for water resources management. Projects undertaken by BGS include:

- Groundwater management in drought-prone areas
- Diagnostic method to determine aquifer susceptibility parameters
- Development of a small-island information network
- Groundwater protection and management for developing countries
- Groundwater from low permeability rocks in Africa

Theme W3: Increased protection of water resources, water quality and aquatic eco-systems. This covers all aspects of water quality degradation including problems related to industrial and domestic waste disposal, including monitoring, management, prevention and treatment strategies. Projects undertaken include:

- Protecting groundwater beneath wastewater recharge sites
- World Bank paper on urban groundwater management strategies
- Human risk in relation to landfill leachate quality
- Improved collector well construction
- Assessing risk to groundwater from on-site sanitation

Theme W4: Raise the well-being of the rural and urban poor through cost-effective improved water supply and sanitation. There are still significant problems in enabling the three billion people who lack sanitation and over one billion people lacking adequate water supplies to have access to affordable, effective, equitable, sustainable and efficient sanitation and water supply services. The challenge is to apply existing technologies in the complex social, institutional and economic context of water supply and sanitation. Issues include effective enabling environments; empowerment and participation; financial sustainability and resources; environmental management (related to water and sanitation); development, application and promotion of technologies, and; expanding the knowledge base. Projects undertaken include:

- Development of new well-siting techniques
- Integrated framework for RWSS in groundwater-dependent areas
- Groundwater drought early warning for vulnerable areas

Theme W5: Improved availability of water for sustainable food production and rural development. This theme concerns strategies to improve food productivity through the more efficient use of water. Projects undertaken include:

- Potential for aquaculture using saline groundwater

Conclusions

DFID's Knowledge & Research programme is extremely broad-based and this paper provides information only on a small part of the work programme undertaken by BGS. The oral presentation will further discuss the dissemination of results including the outcomes and achievements of the programme drawing on the results of specific projects. For those interested, ongoing progress of KaR projects is summarized in a series of bi-annual newsletters published in both hard-copy and on the World Wide Web. The KaR Geoscience website may be found at: www.bgs.ac.uk/dfid-kar-geoscience/ from which links to the other sector websites are provided.

Acknowledgments

The author wishes to thank DFID for support over several years provided under the KaR programme including attendance at this meeting. This paper is published with the permission of the Director BGS (NERC).