2.1 Management, Protection and Sustainable Use of Groundwater – Results of Long-Term Technical Co-operation in the Middle East

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2.1.1 Introduction

Groundwater represents the main water resource in most parts of the arid and semi-arid regions of the Middle East and Northern Africa. Adequate groundwater management is a prerequisite for the sustainable use of the scarce water resources. Groundwater protection measures have to be incorporated in integrated water management activities as an important feature for sustainable development. To fulfil these requirements, the German Federal Institute for Geosciences and Natural Resources (BGR) supports since several decades some national ministries and institutes as well as international organisations which are operating in the groundwater sector in this region.

During the seventies and eighties, work was mostly concentrated on the assessment, exploration and use of groundwater resources. In the following years the interest in groundwater protection issues grew continuously. This shift in interest was induced by the improved knowledge of the processes and events influencing the groundwater regime and the quality of the groundwater. Better understanding of groundwater issues made it obvious that groundwater protection is one of the main pillars for sustainable use of the scarce water resources in the Near East. It was not acceptable any more to diminish the potable groundwater resources by often irreversible contamination. The trend from quantity oriented to more quality oriented groundwater studies can easily be seen in the changes in the focal points of the projects as shown in this paper.

This improved knowledge led to changes in the people’s mind. Sustainable and careful use of the scarce groundwater resources became a key issue. Consequently, project activities were not only concentrated on advice for the use of modern methods, e.g. for the preparation of planning documents, but also for the preparation of groundwater-related guidelines and policies as part of an overall strategy for better groundwater resources management. Based on the understanding that the guiding principles for sustainable groundwater use have to be implemented by governments and their administrations, this last topic forms now a fundamental part of German Technical Co-operation and is an important component of the ongoing groundwater related projects.

The following examples of bilateral and international co-operation show the changes in the types and goals of technical co-operation projects. The presented results highlight the groundwater situation in the Near East and should provide understanding for the wide range of problems related to the groundwater situation.
2.1.2 Bilateral co-operation: Jordan

In the early projects, the assessment of the groundwater resources was based on the results of geophysical investigations and hydrogeological field work. These investigations and the interpretation of the results were mostly carried out by foreign organisations and their contractors. The partner institution often played a minor role because of insufficient knowledge and experience especially in modern geophysical, mathematical and hydrogeological methods and lack of adequate equipment. To overcome this situation, improvement of the infrastructure and the qualification of the personnel of the partner institutions got high priority in all co-operation projects and formed an essential part of the overall project strategy. In turn, the role of the project partners in the Near Eastern countries changed with improving qualification. More and more, investigations and data interpretations were carried out by the specialists of the partner institution. Scientists and technical specialists of the foreign organisations assisted as advisors only. Support and advice in learning and using modern methods in groundwater management and groundwater protection are today well to the fore.

Groundwater cooperation projects with Jordan and groundwater models and modelling results in particular, are examples for this development as shown in the following.

Support for the preparation of the National Water Master Plan (NWMP) in 1977 was one of the first major groundwater activities of the BGR in Jordan (GTZ 1977). Data collection was mostly done by the Natural Resources Authority of Jordan (NRA), data interpretation and map preparation by German specialists. This NWMP was the first comprehensive study of the water resources of the entire country. It gave an overview of the water situation and served as a general planning basis for about twenty years. Thematic maps show the hydrogeological situation, e.g. favourable areas for ongoing or potential groundwater exploitation and available volumes of stored groundwater. For the new NWMP the same boundaries of water basins have been used as they had been defined during that survey.

In the following years, co-operation of BGR with Jordan was concentrated on other sectors like geology and geophysics. Studies in the water sector continued on a quite different level with an investigation of the possibilities to supply an envisaged oil shale processing plant at El Lajjun with water. Fig. 2.1.1 shows the location of the study area in the Mujib basin and Fig. 2.1.2 an impression of the landscape and the base flow in the upper Wadi Mujib. The data collection and the field work for this hydrogeological study was supported by the Water Authority of Jordan (WAJ). Most of the hydrogeological interpretation as well as the numerical modelling were still done by BGR but on-the-job-training was already an important issue.