

Education in environmental hydrology: The case for its implementation in the developing world*

B Rawlins

Department of Hydrology, University of Zululand, Private Bag X1001, KwaDlangezwa 3886, South Africa

Abstract

The emergence of environmental consciousness in South Africa can be seen as a relatively recent phenomenon that has, in part, been facilitated by an increased global environmental awareness. As a consequence, environmental issues are now taken more fully into consideration in the political, economic and social spheres of the country. This paper shows how these environmental issues contain significant hydrological aspects and how, through the education of hydrologists, policy-makers and the public, the hydrological sciences can play an important role in environmental management.

Introduction

The past few decades have seen a dramatic increase in world attention to the environment. In the main, such attention has emanated from the western "developed" nations, and has been directed on the one hand at local, regional and national issues, and on the other at issues of global concern. Notably absent, however, has been an attempt to address environmental problems in the "less developed" countries. Although accusations have been made, little has been done to guide or help Third World policy-makers achieve a sound environmental status.

South Africa is a particularly interesting case in point, combining as it does different stages of development. From a hydrological review of the local press over the past few years, two trends are apparent: increased environmental awareness, and continued poor environmental control. Events and conditions that have been highlighted include the spillage and discharge of industrial effluent; gross pollution of rivers; the variety of problems associated with large-scale informal settlements; and general catchment degradation. This emergence of environmental consciousness in South Africa has caused environmental issues to be taken more fully into consideration in the political, economic and social spheres of the country. How successful such consideration has thus far been is a matter for debate, but it is heartening to note that at least some progress has been made.

In the hydrological sciences, it is evident that the upsurge in environmental interest has been responsible for a greater public awareness of, and consequently a greater recognition of, the subject. One of the effects is an increase in employment prospects for the hydrological sciences. Associated with this, however, is a need for professional development. In almost every environmental issue that occurs, we witness, through the media, members of the public, government representatives and industrialists stating that the hydrology of the particular issue is important. While this is invariably true, since the protection, conservation and utilisation of the country's water resources is of national importance, there remains a disquieting sense that the term hydrology is either being used just as a buzzword to satisfy those perceived as "radical greenies", or to convey the rather nebulous "scientific"

concept of having something to do with water. Even given such an ill-informed use of the term, the hydrological community should capitalise on the opportunities afforded by heightened public awareness. The external perceptions of our discipline could be considerably enhanced by the provision of a professional service that not only fulfils the requirements of any particular issue, but also broadens the perspectives of those who have access to the completed product. In order to achieve this aim, it is essential that hydrologists, who in practice have come from different scientific backgrounds, have received different training, and have gained varied experience in the course of their careers, are able to perform their duties to the highest professional standards.

Recent developments in hydrological education, though having significant environmental components (Buras, 1991; Nash, 1992; Yevjevich, 1992), have tended to focus more on the status of hydrology as a discipline (Nash et al., 1990; National Research Council, 1991; Rawlins, 1992; Rodda, 1992), and on the pressing problems of water supply and sanitation in developing countries (Pickford, 1991). For hydrology to consolidate its status as a discipline, however, it needs to incorporate current environmental initiatives into its structure and to embark on a planned programme of education in, and application of, the hydrological sciences in this country. In addition, there is a definite need for the community at large to be better informed about the role that is played by hydrology (and by hydrologists) in maintaining the environmental integrity of the country and the planet.

Hydrology in South Africa

Hydrological expertise is of considerable importance in South Africa since water is both scarce and poorly distributed spatially. This (un)availability of water is further complicated by the irregular nature of the rainfall and by high evaporation rates. Seasonally, most of the country receives rainfall only during the summer months followed by a prolonged dry period. The regular occurrence of periods of below-average rainfall, which can last for years, puts further stress on these meagre resources. Consequently, water resources management has, to date, been directed at creating sufficient reservoir storage to enable yields to be sustained over long periods.

The industrialisation of South Africa has thus far proceeded with little regard for the availability of water. For example, the mining base of the economy which is centred around Johannes-

Received 1 March 1994; accepted in revised form 6 September 1994

* Revised paper. Originally presented at the 6th SA National Hydrological Symposium in September 1993 in Pietermaritzburg and published in the *SANCIAHS Proceedings*.