

Market forces and the management of water for the environment

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Abstract

Development and the environment are no longer considered mutually exclusive, and economic and social considerations are included in the allocation and management of resources such as water and air. As water resources grow more scarce in South Africa, more efficient methods of water allocation for all sectors need to be investigated. An important sector that requires consideration is the natural environment. In 1970 the Department of Environment Affairs recognised the need for the allocation of water for the maintenance of water ecosystems. Of particular interest in this paper is the allocation of water to river ecosystems. At the moment much research is being done on the water requirements of river ecosystems in South Africa, although there is still insufficient information to ensure good management. Theoretically two mechanisms are available for the allocation of water resources: government control and a free-market system. In reality there is a gradation between the two that includes various levels of mixed economics. The present system relies heavily on government control, although in the long run it may be more beneficial for the environment if water markets are set up in South Africa. This would also promote the sustainable development of water resources. The problems that are faced in setting up water markets include the allocation of property rights and initial pricing of water so as to benefit the environment, as well as the requirements of the poor, especially those in rural areas. All these need to be taken into consideration, and further research needs to be carried out on various aspects of water markets and water requirements of river ecosystems. This paper discusses aspects of water management for environmental conservation with particular reference to allocation strategies using market forces and pricing mechanisms. Special emphasis is given to river ecosystems, due to their value as water sources and the critical relationship between catchment processes, land use and these systems.

Introduction

Environmental issues and the management of the earth's natural resources have attained increased priority status throughout the world (World Commission on Environment and Development, 1987). There has been a fundamental change in the way in which governments and development agencies think about development and the natural environment (Munasinghe, 1993). The two are no longer regarded as mutually exclusive, and it is now recognised that a thriving environment is essential to sustainable development and a healthy economy in the long run (Munasinghe, 1993). This has resulted in governments and resource management agencies actively promoting sustainability of the environment and developing policies which reflect a more balanced approach to the use of resources. Thus, economic considerations have been included in the allocation and management of natural resources such as air and water, to ensure that these resources are properly conserved.

One of the key concerns of resource managers is the availability and utilisation of water resources. It is recognised that there is a growing scarcity of water, as surface supplies in Africa, America and Australia approach full utilisation (Brown et al., 1990; Colby, 1990; Martin and Kulakowski, 1991; Pigram and Hooper, 1992; Thomas and Howlett, 1993). Certainly in South Africa, which is semi-arid and hydrologically variable, major water supply problems have been created by a rapidly growing human population and a relatively well-developed economy (Davies and Day, 1986; Ferrar et al., 1988; King and O'Keeffe, 1989; O'Keeffe et al., 1989a). Additionally the water allocation policy of the last 40

years, which has given 50% of the utilisable surface water to irrigators at a highly subsidised price, has exacerbated the situation. With the recognised need for further rapid economic development in South Africa, the sustainable use of water resources is essential. Thus far, developments to provide water of sufficient quality and quantity such as the impoundment of rivers and inter-basin transfer schemes have largely undermined the ecological integrity of ecosystems and contributed to environmental degradation (Petitjean and Davies, 1988; Walmsley and Davies, 1991).

In 1970 it was recognised that water should also be allocated to the natural environment for conservation purposes (Roberts, 1983; Department of Water Affairs, 1986; Walmsley and Davies, 1991). However, the Department of Water Affairs and Forestry (DWAF) has only recently seriously considered the problem of water allocation for the maintenance of ecosystem functioning and taken steps towards developing and implementing a policy for this (Roberts, 1983; Department of Water Affairs, 1986; Department of Water Affairs and Forestry, 1991; Walmsley and Davies, 1991). Serious problems remain in the implementation of allocation policies to provide for environmental water needs. Significant trade-offs may be involved and economic and social costs could be incurred in the integration of competing and conflicting demands for water (Pigram, 1992). Different institutional arrangements and regulatory mechanisms will be required to address the constraints which arise in optimising in-stream and off-stream water uses (Pigram, 1992).

One approach to the allocation of water that would ensure sustainable development could be the use of market mechanisms. Opportunities undoubtedly exist for the wider application of market forces in the acquisition of water for the conservation of the environmental (Pigram, 1992). Already in Australia and the American West water markets, linked to property rights of water, are in existence and regulate the use of water adequately (Gardner

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