A strategic study of the impact of invasive alien plants in the high rainfall catchments and riparian zones of South Africa on total surface water yield#

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Abstract

The aim of this study was to develop a methodology to determine the impact of upland (non-riparian) invasive alien plants in the high rainfall catchments and riparian areas in all catchments on the total surface water yield available in each of the water management areas of South Africa. This would enable the Department of Water Affairs and Forestry (DWAF) through its public programme *Working for Water* (WfW) to develop a user charge system for the clearing of invasive alien plants in South Africa. It was found that the total impact of upland invasive alien plants in the high rainfall catchments on the total surface water yield of the country, which included the yield from major dams, minor dams and run-of-river yield, was currently approximately 172 x 10^6 m^3/a and could go up to as much as 1 410 x 10^6 m^3/a in the future. The impact varied greatly between water management areas and had the potential to reach 50 % (195 x 10^6 m^3/a) of registered water use in the Thukela WMA in the future if not controlled. The reduction in yield due to invasive alien plants in the riparian zone in all catchments was estimated to be approximately 523 x 10^6 m^3/a under current conditions and this could increase to 1 314 x 10^6 m^3/a if the riparian zone was allowed to become fully invaded. The combined impact was estimated at 4% of current registered water use and could increase to 16 % of registered water use in the future.

Keywords: invasive alien plants, surface water yield, South Africa

Introduction

It is well documented that invasive alien plant species (IAPs) reduce the availability of water through a reduction in mean annual runoff (MAR) and hence on water yield (Görgens and Van Wilgen, 2004). There is, however, still uncertainty about the magnitude of this impact, particularly at a national scale. Combating the spread of IAPs is becoming increasingly important as South Africa is searching for ways to augment and secure its water supply in the light of the increased cost of infrastructure development and the limited options available to introduce further supply-side measures to water augmentation. There should therefore be no question about the need to explore and implement alternative water augmentation schemes, such as through the removal of IAPs, which, as an added benefit, could contribute significantly to poverty alleviation and the development of the economy of the country and the fulfilment of obligations under the Convention on Biological Diversity.

In a recent external evaluation of the WfW Programme, it was estimated that the cost of removing all existing IAPs (excluding the impact of biological control on the spread of some species), amounts to approximately R1.6 bn. According to the Conservation of Agricultural Resources Act, the responsibility for the control of IAPs lies with the land user. However, taking into account the history of alien plant invasions in South Africa, the current land user cannot be held fully accountable for the control of IAPs. Government itself played a major role in the introduction of the majority of IAPs, for reasons stretching from commercial to natural resource rehabilitation (drift-sand stabilisation) to horticultural use. In addition, with major poverty alleviation and biodiversity benefits, the question could be asked: why not recover the full cost of clearing IAPs from the government tax base?

Government already makes a substantial contribution to this process through the Expanded Public Works Programme. This contribution amounts to R380 m./a in the form of the current WfW activities, plus some contribution through the *Working on Fire* (a portion of R44 m.), *Working for Wetlands* (a portion of R30 m.) and *Landcare* Programmes. The current extent of the problem, however, is of such a nature that the above contributions through general taxes, as well as the efforts of individual land users, are simply not going to be able to prevent the spread of IAPs. Land and water users have to contribute to controlling the problem. Land users already contribute through individual clearing programmes to protect their land. What is now required is an integrated strategy for the control and management of IAPs. In order to contribute to such an integrated strategy, the aim of this study is to develop a fair mechanism to get water users to contribute to the control of IAPs, to the extent where they would get good value for money in terms of enhancing:

- The yield from dense infestations where there is a negative effect on utilisable water
- Water security by preventing further spread of IAPs that will have a negative impact on future yields.

As in the case of the land user (productive potential of land) the water user (productive potential of water) will therefore pay for the service of enhancing and securing the restoration of the natural capital base.

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