



water & forestry

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Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

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MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

NATIONAL ASSEMBLY: QUESTION 264 FOR WRITTEN REPLY

A draft reply to the above-mentioned question asked by Mr M J Ellis (DA), is attached for your consideration, please.

DIRECTOR-GENERAL

DATE: 02/07/09

DRAFT REPLY APPROVED/ AMENDED

MS B P SONJICA, MP
MINISTER OF WATER AND ENVIRONMENTAL AFFAIRS

DATE: 14. 07. 2009

NATIONAL ASSEMBLY

FOR WRITTEN REPLYQUESTION NO 264

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(INTERNAL QUESTION PAPER NO 4)

264. Mr M J Ellis (DA) to ask the Minister of Water and Environmental Affairs:

- (1) Whether any quantitative studies have been conducted to measure the effectiveness of the Working for Water programme in improving water availability; if not, why not; if so, (a) what areas have been studied, (b) on what dates and (c) what were the relevant results of these studies;
- (2) whether her department intends to conduct more studies in this regard; if not, what is the position in this regard; if so, what are the relevant details?

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REPLY:

- (1) Yes, Working for Water in partnership with the Water Research Commission (WRC), the Council for Scientific and Industrial Research (CSIR) and Academic Institutions has conducted a number of studies on the impact of clearing on stream flow.

(a) & (b) Such studies have been conducted at different levels and scales. At a site scale the following studies were conducted:

- Dye, P. J., Jarman C., 2004. Water Use by Black Wattle (*Acacia mearnsii*) implications for the link between removal of invading trees and catchment stream flow response. South African Journal of Science 100, 40-44. – (Area where study took place – KwaZulu Natal)
- Dye, P. J., Poulter A.G., 1995. A field demonstration of the effect on stream flow of clearing invasive pine and wattle trees from a riparian zone, South African Forestry Journal 173: 27-30. – (Area where study took place – Mpumalanga)
- Prinsloo, F.W., Scott D.F., 1999. Stream flow responses to the clearing of invasive alien trees from riparian zones from three sites in the Western Cape Province. South African Forestry Journal 185: 1-7. – (Area where study took place – Western Cape)

The most recent study that WRC, CSIR and Working for Water collaborated on was:

- Everson, C., Gush, M., Moodley, M., Jarman C., Govender, M. & Dye, P. (2007) effective Management of the riparian zone vegetation to significantly reduce the cost of catchment management and enable greater productivity of land resources. WRC Report No. 1284/1/07. – (Area where study took place – KwaZulu Natal)

- (c) The results (impacts of invasive alien trees on stream flow) of the above as well as earlier research are summarized in Table 1 below (extract from Blignaut et al 2008):

(A) Long-term reductions in runoff measured in experimental catchments after commercial forestation					
Catchment (Site)	Area (ha)	Mean annual rainfall (mm/a)	Mean annual reduction in runoff (mm/a)		
Cathedral Peak (KZN)	60 – 190	1 400	260 (2 600 m ³ /ha-a)		
Jonkershoek (Western Cape)	30 – 250	1 300 – 2 300	130 – 300 (1 300 – 3 000 m ³ /ha-a)		
Westfalia (Limpopo)	30 – 60	1 600	200 (2 000 m ³ /ha-a)		
Mokobulaan (Mpumalanga)	25	1 150	340 (3 400 m ³ /ha-a)		
Witklip (Mpumalanga)	110 – 160	1 475	280 (2 800 m ³ /ha-a)		
(B) Riparian clearing experiments					
Catchment (site)	Vegetation	Short-term average streamflow increase (m ³ /cleared ha-d)			
Ewartkops (Eastern Cape)	Wattle	13			
Lydenburg (Mpumalanga)	Pines & Wattle	12			
Witklip (Mpumalanga)	Pines & Scrub	22			
Du Toitskloof (Western Cape)	Wattle & Eucalyptus	9			
Oaklands (Western Cape)	Wattle & Eucalyptus	10			
Somerset West (Western Cape)	Wattle & Eucalyptus	12			
Jonkershoek (Western Cape)	Pines	31			
Westfalia (Western Cape)	Indigenous forest	15			
(C) Evapotranspiration measurements					
Catchment (site)	Vegetation (riparian)	12-month evapotranspiration (mm)			
		Transpiration	Interception	ET	Difference
Jonkershoek (Western Cape)	Wattle	1 318	173	1 489	157 (1 570 m ³ /ha-a)
	Fynbos			1 332	
Karkloof (KwaZulu-Natal)	Wattle	1 077	185	1 260	424 (4 240 m ³ /ha-a)
	Grasslands			836	
(D) Riparian vs. non-riparian reductions in runoff					
Catchment (site)	Treatment	1 st year increase in streamflow after treatment (m ³ /ha cleared)		Ratio of riparian: non-riparian increase	
Westfalia (Limpopo)	Clear riparian indigenous forest	5 445		2:1	
	Clear non-riparian indigenous forest	2 700			
Witklip (Mpumalanga)	Clear riparian scrub & pines	7 965		1.9:1	
	Clear non-riparian pines	4 045			
Biestevlei (Western Cape)	Clear riparian pines	11 505		3.4:1	
	Clear non-riparian pines	3 430			

Görgens and Van Wigen (2004)

The above results and earlier research were then applied to estimate the local regional and national impacts of invasive alien plants on water resources. These studies included:

- Cullis, J.D.S., Görgens, A.H.M., Marais C., 2007. 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 Water SA 33, 35-42. – (Area where study took place – National)
- Larson, E.J., Marais, C., Görgens, A.H.M., 2001. Water resources planning with recognition of alien vegetation eradication. Tenth South African Hydrological Symposium 26 – 28 September 2001. – (Area where study took place – Western Cape at George)
- Marais, C., & Wannenburg, A.M., (2008) Restoration of water resources (natural capital) through the clearing of invasive alien plants from riparian areas in South Africa - costs and water benefits. South African Journal of Botany doi.10-1016/j.sajb.2008.01.175 – (Area where study took place – National Level)

The most significant findings of the above studies were as follows:

Cullis et al 2007 found that the total impact of upland invasive alien plants (IAP's) in the mountain catchment areas 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 172 Mm³/a, and could go up to 1410 Mm³/a in the future. The impact varied greatly between Water Management Areas (WMAs) and had the potential to reach 50 % (195 Mm³/a) of registered water use in the Thukela WMA in the future if not controlled. The reduction in yield due to IAP's in the riparian zone in all catchments was estimated to be equal to 523 Mm³/a under current conditions and this would increase to 1314 Mm³/a if the riparian zone was allowed to become fully invaded. The combined impact was estimated to currently be equivalent to 4 % of registered water use and would increase to 16 % of registered water use in the future.

Larson et al 2001 found that when clearing invasive alien trees from the mountain catchments in the Outeniqua Mountains above the town of George under different management scenarios can reduce the cost of water yield by between 2% and 56%.

Marais & Wannenburg (2008) found that overall it is estimated that around 7% of riparian invasions have been cleared between September 1998 and August 2006 resulting in significant yield increases. The increased estimated yield of 34.4 million m³ is about 42% of the yield of the new Berg River Scheme in the Western Cape (81 million m³). The investment in clearing species known for excessive water use from riparian areas at a cost of R116 million was found to be a very good investment. It is however important to note that the clearing of invasive alien plants will seldom result in the total elimination of short falls in water supply and should be seen as part of a package of water resource options to optimize supply, aimed at minimizing wastage of water.

It must be mentioned that the above are some examples of research that has been done, with a specific objective in mind. Much more research has been done on the programme over the last 13 year. Most of the research was however done to address specific questions.

The Everson et al 2007 research is ongoing, so is the work reported on by Marais & Wannenburg (2008) in the form of implementing payments for watershed services.

- (2) Yes, the Department has collaboration agreements with the Water Research Commission, CSIR and Academic Institutions aimed at ongoing research on the impacts of invasive alien trees with much of the focus on water and biodiversity.

The researchers are all encouraged to publish the research in peer reviewed scientific publications to ensure that the research is of the highest possible quality. The programme also has a research advisory panel that advises on research approaches and quality.