Clearing water-thirsty **alien plants**

Here are some Frequently Asked Questions about water-consuming alien vegetation and how it can be managed to maximise water supply for development:

Q. What are invasive aliens?

A. Invasive aliens are plants which come from another part of the world, but are well suited to local conditions. They spread rapidly, choking out indigenous plants, and they consume large quantities of water, sometimes blocking up rivers and wetlands. They also burn faster and hotter than indigenous plants in a fire. Examples of alien plants are black wattle, pompom weeds, or Port Jackson willow.

Q. How do alien plants reduce water supply?

A. Because alien plants tend to be water-thirsty, they suck up water that could otherwise go to indigenous plants, into the groundwater, or into wetlands and rivers. Nationally it is estimated that alien plants consume 3 300 million m^3 of our precious water resources each year – the equivalent of 6.7% of the total natural river flow countrywide, or 26 large dams!

Q. What is Working for Water?

A. Working for Water was established in 1995, using labour-intensive mechanical and chemical methods to remove alien plants from mountain catchments and river corridors. The programme creates temporary jobs and provides training to unemployed people, while also restoring the productivity of the land and the natural functioning of these ecosystems – the way water moves, the way fires burn, and the way plants and animals live. Between 1995 and 2009, Working for Water spent R4 billion clearing nearly 2 million hectares of invasive alien plants countrywide, creating 27.5 million person days of employment.

Biodiversity Briefing Series

This series was developed for the Cape Action for People and the Environment (C.A.P.E.) partnership programme, with support from the South African National Biodiversity Institute (SANBI), the Wilderness Foundation and the Critical Ecosystem Partnership Fund.

Biodiversity Briefing Series 3

Q. How does alien clearing increase water supply?

A. Clearing river banks allows water to flow freely and the raises the level of the river, since less water is taken up by indigenous plants along the banks than by the thirsty alien plants. Between 1998 and 2006 about 7% of river areas in South Africa were cleared, resulting in an estimated extra 34.4 million m^3 of water becoming available at a cost of R116 million – a good investment. Clearing mountain catchments also enables more rain to soak into the ground, from where it can move along underground aquifers into rivers, lakes and wetlands or become available for irrigation using boreholes. Alien clearing is one part of government's plan to increase water supply, which also includes managing demand and expanding infrastructure.

Q. How do alien plants affect fires?

A. If alien trees and shrubs are allowed to spread across the landscape, they increase the risk of large fires that get out of control and threaten life and property. Alien vegetation often has a higher oil content and burns hotter and faster than indigenous vegetation. These fires leave very little behind, causing soil erosion when the rains come. Many alien plant seeds germinate after fires, causing them to spread faster than before and cost more to clear. Following fires over 40 000 ha in 2006 in the Western Cape, CapeNature estimated these additional costs at R17.5 million. If 95 000 ha infested with aliens burns in unplanned fires each year in South Africa, the additional costs to control these infestations would be around R95 million annually.

Q. What is biocontrol of aliens?

A. Biological control or "biocontrol" is the use of living agents such as insects or fungus to slow down the growth of alien plants – usually by reducing the number of seed or destroying parts of the plant. Biocontrol is often used together with mechanical clearing and the use of chemicals.

Clearing firebreaks prevents large fires that cause soil erosion and water runoff

© Working on Fire

In South Africa biocontrol is always practised in terms of strict safety protocols, and has been very effective in reducing the density of certain aliens, e.g. *Acacia saligna* (Port Jackson) through the use of the gall wasp, making mechanical clearing easier and cheaper. Economists estimate that without biocontrol, the country would have lost R48.2 billion per year in terms of the services provided by ecosystems such as water, grazing and biodiversity

Q. Is alien clearing a "quick fix"?

A. No. Alien clearing is a complex process that needs to be continued over many years before an area is completely cleared. The period of initial control is the most labour-intensive and costly. The follow-up phase from the second year targets secondary seedling invasions and can vary from one to many years. After this, in the maintenance phase seedlings can be controlled with minimum input. Incomplete alien clearing efforts can actually worsen alien infestations, causing people to lose confidence in the value of alien clearing.

Q. What about Working for Wetlands?

A. Wetlands act like giant sponges, trapping and storing a lot of water for use, for example, by farmers. The vegetation in them filters the water and makes it purer, saving government the cost of having to build water treatment works. Working for Wetlands is another public works programme that provides work opportunities – doing earthworks, replanting and rewetting wetlands to get them back to a state as close as possible to their natural state.

Clearing alien plants makes more water available in rivers and groundwater

Caroline Gelderblom

Biodiversity
as a Resource for Delivering Water

South Africa has a wealth of natural resources that are key to our development as a nation. Our natural resources include our minerals, our soil, our water and our biodiversity – for example, fish stocks, medicinal plants and game. Natural resources are a form of capital, like infrastructure, land, labour or finance – we can see them as "natural capital".

As a nation, we need to invest in maintaining, restoring and building our natural capital, so that it can help support socio-economic development for all our people. Investing in looking after our biodiversity is a way of ensuring that it works for us, to fulfil our goals of:

Creating work and sustainable livelihoods

Achieving rural development, food security and land reform

Delivering water for the nation's needs

Providing protection against climate change

Mark Wing

What is Biodiversity?

Biodiversity is the full variety of life on Earth – from the tiniest plant to the largest animal. Its complexity is measured in terms of variations in: the number of different species, the genetic wealth within each species and the interrelationships between species in ecosystems.

South Africa is one of the most biodiverse countries in the world: with a land area of 1,2 million km² - representing just 1.24% of the Earth's surface - South Africa contains almost 10% of the world's known bird, fish and plant species, and over 6% of mammal and reptile species.

© photo by Mark Wing

Increasing **water supply** for development

South Africa is a water-scarce country and the supply of fresh water is a major constraint to future development, with demand likely to outstrip supply by 2025. Scientists predict that climate change will worsen this situation, as the interior of the country becomes warmer, and the western part becomes drier, with more intense and frequent fires. Rainfall patterns are expected to become less regular countrywide – with more sudden downpours, causing much of the rainwater to run off without being captured, and which can lead to drought or flooding.

Managing biodiversity effectively can contribute to maintaining a steady supply of water. This includes clean water for drinking, as well as water to supply farms, factories, mines and power plants. Mountain catchment areas with natural vegetation are "water factories" – they slow down the runoff from rainfall and allow it to seep into the earth as groundwater, instead of flowing away. Keeping biodiverse natural vegetation also prevents soil erosion when there are heavy rainfalls – particularly on mountain slopes and along river corridors. When land is ploughed right up to the river's edge, heavy flow erodes the riverbanks, valuable soil is washed away and sediment is carried into estuaries and sometimes drinking water.

Water is essential for development in South Africa

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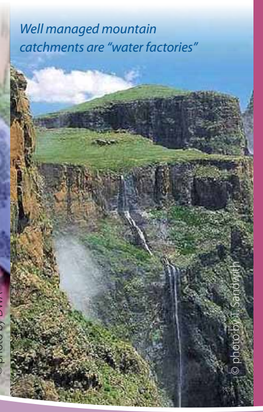
Well managed mountain catchments are "water factories"



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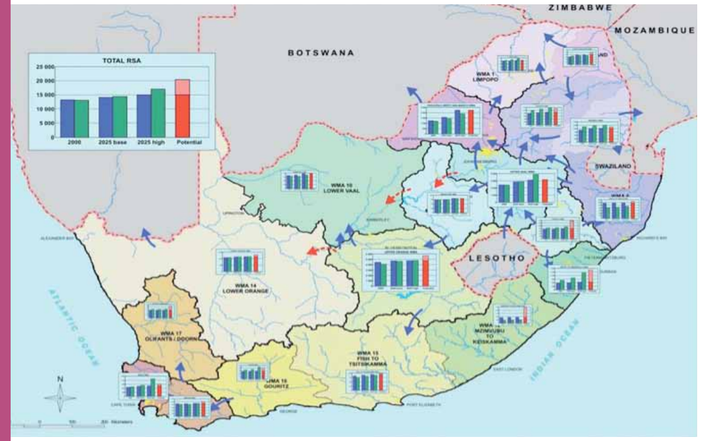
Delivering water for the nation's needs

To maximise the amount of water available and its quality, government has committed itself to managing river catchments in an effective and integrated way. Catchment Management Agencies and Water User Associations are being established to involve all role-players in this process, including emerging and commercial farmers, the Department of Water Affairs, the national and provincial Departments of Agriculture and the provincial conservation authorities. Two important aspects of catchment management are managing fires and clearing alien vegetation.



Water usage (green) vs. supply (blue) - DWAF, Water for Growth and Development Framework Version 7

Working for Water in the Tsitsikamma Area

The name "Tsitsikamma" is a Khoisan word meaning "place of much water". The Tsitsikamma Area of the Garden Route National Park incorporates 80km of rocky coastline with Coastal Fynbos and spectacular sea and landscapes, a remote mountainous region with secluded valleys covered in Mountain Fynbos and Afro-montane Forest, with deep river gorges leading down to the sea. The park also has a wide variety of birds, fish and other animals.

All this biodiversity is under threat, however, from invasive alien species such as *Hakea sericea* (silky hakea), *Acacia mearnsii* (black wattle), and *Acacia melanoxylon* (blackwood) high up in the Outeniqua and Tsitsikamma mountains and *Pinus* spp. (pines), *Eucalyptus* spp. (eucalypts) and *Acacia Cyclops* (Rooikrans) along the coastline of the park. The invasive plants in the mountain catchment areas often use more water than the indigenous vegetation and, as a result, have dramatically reduced groundwater levels and the flow of water in the Palmiet and Keurbooms Rivers.

Over R29 million of state funding has been spent in clearing 18 000 hectares of alien invasive trees and shrubs and about 8 000 ha of regrowth, with most work being done in the upper regions of the Palmiet River around Soetkraal through the ***Working for Water*** programme. This has led to noticeable improvements in the rivers and their functioning within a few years, in the form of restored wetlands and seeps around the river channel. It is estimated that further clearing could release an estimated 47.43 million m^3 of water.

If the aliens are allowed to spread unchecked in this area, they could potentially consume up to 204.19 million m^3 of water each year. By clearing these invading alien plants, the ***Working for Water*** programme is restoring ecological functioning to the park and preventing the loss of plant and animal species. Erosion of the river banks is prevented, as a stable cover of indigenous species is re-established. Thickets of a single plant are being removed, allowing the natural biodiversity to return. And removal of the excess biomass of the alien plants is allowing natural fire cycles and water regimes to resume. The ***Working for Water*** programme has also provided work opportunities and training for local people.

A river in the Tsitsikamma forest

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Factsheet Three