

AN ENVIRONMENTAL PERSPECTIVE ON INVASIVE ALIENS/AQUATIC INVADERS

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Three weeks ago, the Table Mountain chain was threatened by potentially the worst fire in South Africa's history. Its fate rested in the notoriously unpredictable variations in wind direction. Fate was kind on the day, and relatively few houses were burned down. Over 9 000 hectares burnt.

Table Mountain, as we all know is not any old mountain. It has been described as arguably the world's "hottest hotspot" for biological diversity, for its size. It is a system that is adapted to fire, although seldom would it have burnt as extensively as it now did. The afro-mountain vegetation, especially along the rivers, acts as natural firebreaks, and contains the extent of natural fires.

You all know where this is heading. Invading alien plants greatly alter the frequency of intense fires. They have a biomass that is ten-fold that of indigenous species, and this led to the negative impacts that occurred with the fire.

We however also gather at a time when, a mere two weeks ago, various environmental stakeholders launched Ukuvuka: Operation Firestop, putting in place a campaign specifically aimed at the controlling of invasive species, in order to curb the intensity of future fires, and to conserve biological diversity in the Cape Peninsula National Park.

These Cape fires starkly represent the fact that invasive species are a major threat to the functioning of natural systems, and the conservation of our biodiversity heritage. Invading alien plants already affect more than 10 million hectares of our country, and are spreading at an alarming rate. As Minister Kasrils has said, they have a very negative impact on water security, and on the function played by water in ecosystem functioning.

1. Impact of Alien Species on Ecological Functioning and Biological Diversity

The loss of biodiversity is one of the most serious environmental problems of the modern era. Aliens compete and threaten indigenous species. South Africa has nine times more plants than the mean for all countries worldwide. In this country, the alien invader problem is so extensive that there is, in fact, far more land infested with weeds than there is planted to commercial tree farms.

There is no doubt that, unmonitored, this situation can have a huge impact on the economy. Reports of R10.5 billion and R35 billion annual losses in the Australian and US economies respectively must be adequate warning for all of us.

Plant invaders have received the most attention through campaigns such as Working for Water. These invaders pose the most serious threat to the survival of biomes which have both numerous and rare endangered plant species. In 1984 it was estimated that 20.5% of the Fynbos biome was invaded to some extent by Acacia, Hakea and Pinus species. Dense stands of these species result in local extinction of fynbos species and significantly reduces fynbos community-level richness. In addition to this, they have a direct negative impact on ecosystem functioning, well illustrated by the devastating fires alluded to earlier, when they provided fuel to the fires well in excess of the natural vegetation.

Alien species have been introduced for a variety of reasons, including commercial reasons. These include sport-fishing and hunting, agriculture, horticulture, agriculture and forestry,

biological control, increasing the range of rare species, through the aquarium trade, for enhancing fisheries or by accident.

Aquaculture is one of the main sources of invasive crustacean parasites and fishes. The aquatic alien species originated mainly from Europe, but also from South America, elsewhere in Africa, North America and Asia. The first introductions were made in the eighteenth century, but increasing numbers were introduced in the nineteenth and twentieth centuries. Similar patterns are found for most invasive biota.

Invading aquatic plant species, especially *Eichornia*, *Azolla*, *Salvinia* and *Myriophyllum spp.* have a marked impact on freshwater ecosystems by altering flow patterns, decreasing oxygenation and reducing light intensity. They accumulate large quantities of detritus resulting in river blockages, interrupted water flows, difficulties in the treatment of water to potable standards, increased breeding sites for vectors and intermediate hosts of human and stock diseases and inhibit recreations use of the water bodies.

Plants are by no means our only invasive alien problem. All major southern African river systems are inhabited by alien animal species. Freshwater systems have been invaded by 54 animal species and four of these have established themselves in the seas surrounding South Africa. 37 of these are considered detrimental to the ecosystem. Through competition for food and space, predation, hybridisation, the introduction of parasites and diseases, disruption of breeding behaviour and habitat alteration. 18 of them are considered to have had a major detrimental impact on indigenous species and communities. Among the most harmful and widespread are fish parasites, gastropod snails and various fishes, including trout, carp, bass, swordtails and guppies. Invasive aquatic plants and animals detrimentally affect water quality as well as the usefulness of water to a range of end users.

2. Need for Comprehensive Legislation

There are a variety of actions that are taking place to deal with invasive species, including the use of biological control agents, where we have had significant success in the past through the efforts of the Plant Protection Research Institute of the Agricultural Research Council. But there can be no doubt that we shall not succeed if we do not put particular effort into both education and legislation.

How do we deal with the fact that some of these invading aliens are actually commercially useful? I believe that the real solution lies in exercising more care when importing them into our countries. For example, the release of a seed feeder along with a useful agro-forestry tree such as *Leucaena leucocephala* will prevent the tree from getting out of control.

The long years of environmental neglect and international isolation resulted in the current state of fragmented legislative framework governing how our country should deal with the whole array of issues relating to environmental management. This state of affairs resulted in a variety of responsible departments, such as the Department of Environmental Affairs and Tourism, the Department of Agriculture and the Department of Water Affairs and Forestry drafting different pieces of legislation to govern what is essentially the same area of work. This situation needs to be corrected. A coherent legislative framework needs to be created and streamlined along the lines of the principles endorsed by the Convention on Biological Diversity. Amongst these it must take into account the capacity to do research on these issues; education and public awareness and mitigation of impacts using techniques that are cost-effective, safe to the environment and yet ethically and culturally acceptable.

3. International Co-operation

The area of invasive species has a very heavy emphasis on international co-operation. It is for that reason that a symposium of this nature is happening under the auspices of the US - SA Bi-National Commission, and will go a long way in seeking the best ways to enhance international co-operation in this very important area as we go into this century.

There is a need to look at the state responsibilities to ensure that alien invasive biota are not transferred to another state or brought into its own state. Implementation of border control; exchange of information between states and other types of co-operation or capacity building are amongst the many ways through which international synergy can be reached. We need to isolate those areas that may need international protocols in order to hold those states that do not perform accountable for their actions.

4. Implication of invasive species on tourism

The scenic beauty that results from well-tended ecosystems and well-kept forests is a boost to the eco-tourism market. The proper control of invasive species in the first instance ensures the relative safety of these resources from extinction through the devastating fires similar to the ones that hit the Cape. The lesson of the Cape fires is that when alien invasive are left to be at large, there can be disastrous consequences to bio-diversity. Today we know that all those many hectares at the foot of Table Mountain all those scenic drives and breathtaking evergreen sights will soon be ready to welcome us in all their glory because the local fynbos only needs one season to reappear.

Controlled introduction of alien species for sportfishing, hunting and aquaculture can help grow a totally different and substantial tourism market. This could in fact be a new niche market that will contribute to our country's economy. The question we need to ask is whether this can be achieved by including, in both the international protocols and domestic legislation, firm controls on intentional introduction of alien species of both plants and animals.

The wonders of the natural environment serve the needs of the tourists; and tourists through their interest and support in visiting these areas, serve the interest of nature conservation. Without the economic advantage of eco-tourism there would be no incentive to preserve eco-systems and without preserved eco-systems, there would be no eco-tourism.

5. Conclusions

I would like to conclude by offering my strong support in taking forward the recommendations coming out of this symposium. The awareness of the problem of invasive species has been heeded by the Government of President Mbeki. We now seek to put in place the best measure to ensure that we prevent and control invasive species in our country and region. My Department is committed to playing its role to achieve this.