THE CONVERSATION
Academic rigour, journalistic flair

Plantations provide cover for lost trees but they are also under threat from pests

September 11, 2015 6.16am SAST

Eucalyptus trees in plantations are particularly vulnerable to pests. MJ Wingfield

Author

Bernard Slippers
Professor of Genetics, University of Pretoria

There are an estimated three trillion trees in the world. This is 46% less than before the development of agriculture and the expansion of human civilisation over the past 12,000 years. The world loses about 15 billion trees a year.

Over the past 25 years there has been a net loss of forest cover of 129 million hectares, an area almost equal to the size of South Africa, according to a report on the state of forest resources released at the XIVth World Forestry Conference in Durban, South Africa. Fortunately the report finds that this trend has slowed over the past five years.

The net loss of forests would have been greater but for the 110 million hectare increase in planted forests over the past 25 years.

To make matters worse, threats to the health of remaining forests are rising. These threats, including climate change, are mostly man-made. One of the most serious yet often overlooked threats comes from the spread of pests. These invasive organisms have already driven some species to near extinction. Many other species are also endangered.

Planted forests have positives and negatives

There are many aspects to dealing with the loss and threats to forests. These include community engagement and education, slowing climate change, ensuring sustainable harvesting, restoring natural forests and more.

Part of the solution lies in the sustainable and optimal use of planted forests.

Not all of the plantations have been positive under all circumstances. They have had a negative impact, for example, when they have been established in sensitive water catchments, areas of native biodiversity, or when planted tree species became invasive.

Fortunately there are also many examples where plantations are managed sustainably, as is recognised by global certification schemes.

In these cases, plantations provide many of the ecosystem services that natural forests offer, including supporting biodiversity. They are highly productive, providing income through jobs and ownership in areas often not suited to any other economic activity. Over and above, they relieve pressure on natural forests.

Vulnerable to invasive pests and diseases

But planted forests are particularly vulnerable to pests, including insects and micro-organisms. These forests are often of nonnative species such as *Eucalyptus*, *Pinus*, *Acacia*, *Populus* or others that are selected because they have no natural pests. They are then planted over large areas with relatively uniform or reduced genetic diversity. When pests catch up, the results can be devastating, with varieties or even species lost.

Of concern is the increasing rate at which invasive pests are emerging globally. Once pests emerge in one area, they often rapidly spread to other parts of the world where the same trees are used.

For example, the rate of insect pests emergence in *Eucalyptus* plantations has increased almost five fold since the 1980s, according to as-yet unpublished study by Brett Hurley at the University of Pretoria.

The rate of these arrivals are overwhelming traditional approaches to their management, threatening the stability of the industries and communities that depend on these trees.

A plantation of Pinus trees, including some dead and dying trees infested by an invasive wasp. Bernard Slippers

At the same time, native pests continue to adapt to plantation trees. This is most notable in native trees that are used in plantations. It also occurs on nonnative trees.

There are studies that call for broad and urgent action to save planted forests which are an important resource in dealing with the problem of disappearing native trees.

What can be done?

The threats to planted forests have global origins and cannot be dealt with through isolated local responses. Too many powerful often freely available prevention and management tools remain unused or are applied only locally.

A recent review highlights six aspects that would be needed for an adequate global response to pest threats to planted forests:

1. A central body to co-ordinate global engagement and responses to emerging pests;
2. A central database of global forest pests to aid in communication and knowledge sharing;
3. Shared surveillance tools and information;
4. Co-ordinated knowledge and capacity development for strategies that can be used globally;

5. More structured systems to facilitate the deployment of biotechnological; resources, including biological control; and

6. Protection of genetic resources for key forest plantation genera.

A similar call has recently been made by Bill Gates, the American philanthropist, to deal with the threat of emerging human diseases. For both plantation tree and human health, however, it is not chiefly a lack of knowledge or resources that holds back progress, but complex political and social structures.

Platforms such as the World Forestry Conference and organisations such as the International Union for Forestry Research Organisations (IUFRO) and the FAO of the UN become critical for the sustainability of planted forests, natural forests, and ultimately our planet.

Invasive species **Trees** **Eucalyptus** **Invasive** **Tree pests** **tree cover**