

Communicating forestry facts via hearts and minds

Michelle Harnett and Tim Payn



Planted forests play an important role in improving and maintaining water quality and in modifying water flows

Abstract

To combat some of the common misconceptions about plantation forests, the current science and knowledge around some of their lesser known benefits have been summarised in a series of fact sheets hosted on the New Zealand Forest Owners Association (NZFOA) website. The fact sheets focus on the environmental benefits (ecosystem services) provided by New Zealand plantation forests, and on the need to protect the environment through sustainable forestry practices. The information is accessible to anyone who is interested – landowners, owners and managers of small, medium and large forests, district and regional councils, and the public.

The environmental fact sheets are just one communication tool. Different approaches are needed for different audiences. Conversations between peers that place science (or the facts) in the context of what people value are one of the most effective and influential tools we have to change attitudes, opinions and behaviours.

Introduction

Pandemics, elections, or even whether or not to plant trees – who is telling the true story? Fake news, misinformation, carefully edited video clips, and other sources purporting to reveal a ‘truth’ that ‘they’ are trying to keep from you have been part of our daily information diet for most of 2020.

The ability of any one of us to generate and post content online allows people around the world to share collective interests and worldviews. However, there is no quality control. Blogs, social media, specialist websites and so on contribute to an environment that aids the spread of everything from unverified rumours to malicious lies. Just how (mis)information spreads through social media and other platforms is a rich field of study. Researchers are finding that information related to conspiracy theories, for example, generates homogenous and polarised communities (echo chambers) (Del Vicario et al., 2016).

People are more likely to share with internet friends influenced by similar social norms. The information shared also tends to be content that fits a specific narrative, or an individual's belief system (confirmation bias), regardless of whether it is true or not. Also, false beliefs, once adopted, are very difficult to correct. Social homogeneity is the primary driver of content spread and one frequent result is the formation of echo chambers (Del Vicario et al., 2016).

The narrative around the afforestation of less productive farmland in New Zealand is also heavy with misinformation. The claims of opponents to this practice range from food-producing land being blanket-planted in a sterile monoculture, to carbon plantings that will be ring-barked and left to rot away while 'foreign owners' take their profits out of the country.

The forestry industry is addressing some of the common misconceptions around plantation forests by looking at the national economic impacts of forestry. In the case of 'hard hill' country, plantation forestry and permanent carbon forestry generally offers greater returns than sheep and beef farming (PWC, 2020). However, this work does not consider some of the lesser known benefits of planted forests. Scion scientists working with the NZFOA and others have summarised the current science and knowledge around some of these in a series of fact sheets.

The fact sheets focus on the environmental benefits (ecosystem services) provided by New Zealand planted forests, and on the need to protect the environment through sustainable forestry practices. The information is evidence-based but, for ease of reading, key links and references have been included in a separate section. The information is accessible to anyone who is interested – landowners, owners and managers of small, medium and large forests, district and regional councils, and the public.

The environmental fact sheet series

The series of environmental fact sheets can be found at www.nzfoa.org.nz/resources/file-libraries-resources/environment/factsheets. Selected fact sheets are summarised below.

An introduction to forest ecosystem services

Forest ecosystem services are worth far more in total than the value of wood, fibre and fuel alone. Forest ecosystems are being increasingly recognised in New Zealand for providing services that include climate change mitigation, habitats for native species, recreation, improved water quality, avoided sedimentation and flood mitigation. Together, ecosystem services contribute to prosperity and improved human wellbeing (Yao et al., 2019).

The less tangible ecosystem services are often invisible in discussions around land use and in decision-making. These values can be used to represent ecosystem service values in planning and land management and use

policy. For example, Scion, working with Wenita Forest Products, demonstrated the carbon sequestration and avoided erosion values of their forest estate relative to timber. The sum of the contributions of different services to the total value of the forest shows that the full value or benefit of planted forests can be greater than that of timber alone. This information has helped Wenita renew their product certification under the Forest Stewardship Council (Yao et al., 2017).

Forest soils and fertiliser use

Planted forests are typically located on low-fertility or steep terrain land that is not ideal for agriculture. It is important to look after planted forest soils as they provide benefits such as water filtering and regulating flooding by storing water. It is also important to maintain soil fertility. Fertiliser is not often used in forestry, but its use may increase in the future to boost productivity and/or maintain soil nutrient sustainability over successive rotations. There are also challenges in reducing soil loss through erosion in steep, erodible country, particularly during harvesting.

Forest water dynamics

Our forests provide sustainable sources of high-quality water. Water is an essential resource providing a wide range of economic, ecological, cultural, social and recreational benefits to all New Zealanders. The demand for water is increasing with the intensification of New Zealand's primary sector and the country's growing population and urbanisation. With government tree planting initiatives and the forestry industry's desire to intensify production, planted forests are increasingly seen as a competitor for water resources by downstream users.

The country's 1.7 million ha of planted forests contain an estimated 24,220 km of streams. For most of the forest growing cycle, forested catchments provide downstream benefits, with the potential to supply water during the spring and summer and regulate streamflow during storm events. Water use research shows that even in the driest parts of New Zealand, there is still available water in catchments planted in radiata pine. The water dynamics of planted forests is an area of intense study and the focus of the Scion-led Forest Flows programme – www.scionresearch.com/forestflows

Debris flows

A debris flow is a rapid surging flow of saturated woody debris in a steep channel. They contain very high sediment concentrations by weight and are much more powerful and destructive than water alone. More sediment and water can be accumulated along the flow path, enabling debris flows to 'grow'. Recent highly visible debris flows have drawn media attention and increasing concern about the environmental effects of debris flows and steepland planted forestry.

Landslides and debris flows are natural processes and it is not feasible to stop them completely. However,

the New Zealand forestry industry is responding to the challenge of managing debris flows to minimise impacts within and beyond the forest (see, for example, NZFOA, 2020) using a combination of strategies. These include narrowing the window of vulnerability through:

- Rapid replanting
- Targeted riparian zone management, especially on the lower parts of slopes, fans or where steep channels flatten out as they become unconfined on fans or flood plains
- Retiring areas recognised as having a very high risk of debris flows into permanent forest cover
- Better data and models to assess risk and mitigation options.

Response of a stream ecosystem to debris flows

Coincidentally, the opportunity to study the recovery of a riparian and stream ecosystem after harvesting and extreme rainfall has given us an insight into how forest waterways recover in a worst case scenario (Baillie et al., 2020). Five years after an unexpected debris flow, the invertebrate community in the stream was similar to that prior to harvest. Some fish species had thrived post-event, but others were rare or absent, showing that recovery is a dynamic process. Management practices that enhance and protect riparian vegetation recovery and the re-introduction of large stable pieces of wood into the stream can assist the stream recovery process.

Biodiversity in planted forests

The mix of planted forest stand and native ecosystem remnants that make up New Zealand planted forests are home to many other species, including kiwi, karearea and at least 120 other threatened indigenous species (Pawson et al., 2010). The flora and fauna include shade-tolerant and understorey plants, aquatic organisms, insects, carnivorous snails, other invertebrates, lizards, frogs, birds and bats. Planted forests can function as a haven for some species in highly modified landscapes where they are often the only forest habitat. In fragmented landscapes, planted forests can become parts of corridors that facilitate species movement between otherwise isolated native forest patches and other habitats.

The number of species recognised in planted forests will increase with further research and observation, as will our knowledge of how they contribute to and interact in the planted forest environment. Forest owners and managers can identify, map and manage areas of significant indigenous biodiversity, and develop programmes that take into account local environmental, ecological and cultural conditions.

Planted forests and carbon

Planting trees and forests is one of the best immediate responses to climate change. Sustainably grown trees capture carbon dioxide from the atmosphere to grow and the carbon is stored in the forest biomass. Wood products and buildings continue to store carbon



The largest population of the karearea (or New Zealand bush falcon) is found in Kaingaroa Forest. Planted forests are favoured for their high prey density and the availability of nesting sites in clear-felled pine blocks. Photo courtesy of Bryce McQuillan



Timber buildings are carbon stores. Scion's new building constructed around diagonal grids of laminated veneer lumber (LVL) is storing approximately 0.418 Mt of CO₂-e, the equivalent to the emissions from 160 return flights from Auckland to London

for their lifetime. Trees also provide energy alternatives that can substitute for fossil fuels. Also, timber and other wood products are low carbon footprint materials compared with concrete and steel. The carbon uptake by forests can also be used to offset emissions from other sources. Society needs sustainable sources of energy and raw materials and trees are a sound, sustainable option that we can put into service right now.

Overall, forestry is a net benefit to New Zealand's emissions profile. The industry does emit some carbon dioxide (0.51 Mt CO₂-e), mainly from harvesting, transport and processing, but this is less than 1% of New Zealand's total annual emissions. Emissions of nitrous oxide and methane are very low compared with other primary sector land uses. New Zealand wood processing is also the largest user of solid biofuels for energy generation in the country. Sawdust, bark, shavings and forest residues are used or heat generation in mills and other plants. Some of the larger mills have combined heat and power plants and produce some (or all) of their electricity as well.

Carbon uptake by forests planted since 1989 has also offset about 30% of New Zealand's total emissions between 2008 and 2017. The One Billion Trees programme is calculated to contribute around 20% of the net emissions reductions needed for New Zealand to reach its Paris target by 2030.

Better communication

The environmental fact sheets are just one communication tool. Taking lessons from those involved with communications around childhood vaccination (Leask et al., 2012), different approaches are needed for different audiences. The first is to avoid reflexively correcting what you believe is wrong, an approach that can have the opposite effect and entrench beliefs even further. The second is to decide whether or not it is worthwhile to engage. It is very hard to change fixed beliefs and your energy may be better spent elsewhere. Sometimes it can be best to just agree to disagree if your relationship with the person is important to you.

What is recommended is starting with common ground, listening and asking questions. Acknowledging that someone's concerns are real and that this shows they care about an issue can go a long way. For example, when it comes to afforestation, most people want to look after their land and pass it on to future generations. Concerns that a way of life might be lost with increased tree planting are valid. Then, offer to share factual information and make it personal if possible.

An example could be: 'I believe planting trees is important because my steeper land is eroding badly.' This could be followed by an invitation to talk further. This

is neatly summed up by Taylor and Harnett (2020): '... to drive behaviour change ... will require conversations around the dining table.' Having conversations between peers that place science (or the facts) in the context of what other people in our social networks value and do is one of the most effective and influential tools we have to change attitudes, opinions and behaviours.

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Michelle Harnett is Senior Communications Advisor at Scion based in Rotorua. Tim Payn is a Principal Scientist at Scion and Professor of Forestry at the Toi Ohomai Institute of Technology in Rotorua. Corresponding author: michelle.harnett@scionresearch.com



Appeal for Funds

The NZIF Foundation was established in 2011 to support forestry education, research and training through the provision of grants, scholarships and prizes, promoting the acquisition, development and dissemination of forestry-related knowledge and information, and other activities.

The Foundation's capital has come from donations by the NZ Institute of Forestry and NZIF members. With this, the Board has been able to offer three student scholarships and a travel award each year. It has also offered prizes for student poster competitions at NZIF conferences.

To make a real difference to New Zealand forestry, including being able to offer more and bigger

scholarships and grants, the Board needs to grow the Foundation's funds. Consequently it is appealing for donations, large and small, from individuals, companies and organisations.

The Board will consider donations tagged for a specific purpose that meets the charitable requirements of the trust deed. A recent example has seen funds raised to create an award in memory of Jon Dey who was known to many in New Zealand forestry.

The Foundation is a registered charity (CC47691) and donations to it are eligible for tax credits.

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