This tree may turn the leaf for a brighter environment

HERE is a tree that deserves a hug. It has rescued Indian villagers from starvation and helped fight malaria. But it’s not resting on its laurels.

The pongamia pinnata tree is now being investigated as a way to help Australia’s efforts to avert climate change, by providing a low-cost, non-polluting alternative to greenhouse gas-emitting fuels.

UN advisers on climate change have warned that greenhouse gas emissions must peak within eight years if a global temperature rise is to stay within a manageable level.

Meanwhile energy experts see global oil output reaching a peak in the near future.

The hunt for alternative fuels has begun, but it is a minefield where many solutions have dire side-effects.

While a food-for-fuel debate is raging over the use of edible plants to produce biofuels, scientists say a major untapped biodiesel source, the seed oil of the pongamia pinnata tree, an inedible crop, is worry-free.

A native of South-East Asia, the tree has proliferated in Brisbane because of its tenacity in tough conditions and its ability to provide shade.

The University of Queensland ARC Centre of Excellence for Integrative Legume Research, or CILR, is a world-renowned research network of plant scientists.

Centre director Professor Peter Gresshoff’s team has begun work to establish the tree as a resource for Australia’s nascent biofuels industry.

And it could have a two-fold environmental benefit.

The tree can live for 100 years, all the time sucking in carbon dioxide while producing oil that can displace carbon-belching fossil fuel.

Professor Gresshoff says its hardiness means it will grow on land not fit for food crops, and nitrate fertilisers are not essential during its growth.

Production of palm oil or canola for biodiesel and corn or sugar cane for the bioethanol industry are big users of nitrogen fertiliser which generates greenhouse gases.

Professor Gresshoff says Australia’s diesel requirement is 18 billion litres a year.

Pongamia-derived biodiesel could meet 20 per cent of this demand — a practical initial target — with about 7000 sq km of plantations.

Meeting 100 per cent would require 35,000 sq km.

Australia has between 1 million sq km and 2 million sq km of unused marginal land in which the tree could thrive.

During a speech last year Professor Gresshoff said legume research had potential relevance for the renewable energy field.

The speech led George Muirhead, a Sunshine Coast co-founder of Pacific Renewable Energy, to contact Professor Gresshoff and suggest he look at the potential of the pongamia tree.

Mr Muirhead had seen the tree’s seed oil put to work by an academic who was searching for affordable fuels for villagers in Bangalore.

A boyhood memory of his mother using pongamia for lamp oil led the Indian academic to start a village trial in which the oil was used to power a generator and cold room to allow long-term food storage for the first time.

The pongamia project is now powering up in Queensland.

CILR has now agreed to a $1 million research contract with Pacific Renewable Energy.

Secondly, PRE is set to partner CILR and put in another $1 million as part of a Queensland Government SmartState fund.

“Momentum is really starting to build. We’re getting a proper financial basis for research and now we have to make sure we lay a solid basis for a biodiesel industry in Australia to replace crude oil,” Professor Gresshoff said.

Research aims to isolate elite varieties of the plant.

Professor Gresshoff said 12ha of pongamia planted near Caboolture should, in two or three years, give insight into how its oil handles.
The tree is fast growing but needs to be five or six for a proper harvest using a mechanical shaker.

Mr Muirhead said a key attraction of pongamia was its potential as a biofuel feedstock that can be grown in extreme terrain, such as disused mine sites.

“We think there’s great potential to commercialise when we’ve got the elite genotype. We would focus on areas considered degraded land and that’s potentially a vast area,” he says.

As an example, Comalco has ex-bauxite-mine land near Weipa that has to be regenerated before being handed back to the local Aboriginal community.

“Planting pongamia for biodiesel there would create a residual income and workplace for the indigenous community and potentially give the likes of Comalco the opportunity to tackle their greenhouse gas emissions,” Mr Muirhead said.

Mining firms could use the biodiesel in fleet machines and for remote power generation.

Graziers could use a pongamia byproduct as a cattle feed supplement.

Mr Muirhead says a major limitation for the remote north livestock industry is the protein loss from grass during the dry season.

The leftover portion of pongamia seeds contains up to 30 per cent protein and can be fed to cattle, sheep and poultry.

CILR researchers are “fingerprinting” some of the 1000 identified pongamia trees planted years ago on Brisbane’s footpaths.

Fortitude Valley’s Robertson Street is lined with pongamia that have just been in bloom, bearing white and pink wisteria-like flowers.

Kerrie Sinclair

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ARC Centre of Excellence for Integrative Legume Research, Professor Peter Gresshoff