





The good oil for a better life

Oils from indigenous trees promise a new source of cash income for Papua New Guinea's remote villages

Papua New Guinea has an abundant and diverse genetic resource in its native flora, but exploiting this has rarely gone beyond the subsistence efforts of smallholder villagers. One such resource is the oil found in some indigenous tree species. These potentially could be sustainably exploited to produce income and other benefits, beyond those of subsistence farming. Essential oils have already been used for health and healing and other practical applications, but production has not been commercial.

An ACIAR project with villagers in remote Western Province who otherwise have few sources of cash income, has begun to change this. Past efforts to foster local, cash-generating industries failed, because they were instigated by external groups without local ownership.

But after word of the success of villagers in Papua (Indonesia) in leaf oil production reached the villages of relatives living in PNG's Western Province, people's interest was revived. A request for help in establishing a village-based production system has now been met through an ACIAR project to help develop a sustainable community-based essential oil industry in Western Province.

The project has focused on the South Fly region of

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the province, one of the poorest in PNG. Working with several villages, including Kwiwang, Malam, Bensbach and Rouku, a socio-economic assessment was undertaken. This revealed the need for villagers to work together, and village management committees were subsequently formed.

Local resources were also assessed, revealing that oil of sufficient quality for commercial development was available from nearby tree stands. The source trees of Waria Waria oil and other essential oils were commonly found around villages involved in the project – and oil produced from the Waria Waria tree (*Asteromyrtus symphyocarpa*) was found to have the most commercial potential.

Research plots were established with the aim of identifying silvicultural and best-practice harvesting techniques. Sustainable long-term harvesting strategies based on a light harvesting regime of tree crowns were developed. In 2004, an additional study was established in collaboration with the World Wide Fund for Nature, and this will continue to ensure environmental sustainability in the long term.

Stills for processing oils were upgraded and technical aspects of production were changed.

Also, a marketing consultant was commissioned to study the industry, and this led to a change to the way villagers approach the production and sale of essential oils.

Where previously oil had been bottled in small containers and sold individually, bulk production has become the pre-



‘Villagers in Western Province are beginning to find that a sustainable, cash-generating local industry is achievable’

Building forest management capacity

A key element in the success of projects such as developing Waria Waria oil as an industry is building the capacity of PNG in forestry research and management.

With almost 60 percent of PNG’s land covered by forest, and with increasing pressure to clear or exploit forest resources, effective management is vital.

Current logging practices are largely unsustainable, and may well be reducing income options from domesticating trees and sustainably using resources such as essential oils.

Equipping PNG’s forest managers to better manage and domesticate trees is the aim of a CSIRO Forestry and Forest Products and PNG National Forest Service project, operating under ACIAR support.

The project has developed capacity in domesticating indigenous species, including through provenance and progeny trials. Four species, *Calophyllum euryphyllum*, *Dracontomelon dao* (PNG walnut), *Pometia pinnata* (taun) and *Casuarina oligodon* were all trialled, based on their potential for domestication.

Dr Brian Gunn, of CSIRO Forestry and Forest Products, led the project team that was able to establish effective trials for the first time in many years. “Prior to this project there was only one trial that had been established as a replicated trial in the last 20 years.”

A seed production area for *Acacia mangium*, established under the project and comprising improved germplasm, is now available for distribution to commercial growers through FRI. The seed used to establish the production area was developed in Australia as part of the project.

Conservation strategies for sandalwood and eaglewood germplasm were developed. Propagation and seed-handling techniques relevant to several species were also developed.

The project also delivered 27 training courses, engaging 133 participants from throughout the forestry sector in PNG, including research institutes and universities. Seed cleaning and storage facilities and a seed database were all established. This included the publication of a booklet on *Seed handling and propagation of PNG’s tree species*.

ferred method. The concept of bulk production and supply to commercial manufacturers was explained to management committees and village groups, who now realise this is far more likely to generate real income.

The Kwiwang and Malam village committees voted to adopt bulk production, which would be sold to PNG Franchise Pty Ltd. The returns have steadily grown – 7217 Kina (A\$2920) for 180 litres in 2001, 11,013 Kina (A\$4459) for 275 litres in 2002, and in 2004 the Bensbach and Indoradora villagers received 11,108 Kina (A\$4497) for 278 litres.

In an area devoid of all but the most rudimentary infrastructure, the social benefits of these returns have been profound.

A school is now being built in the village and children are attending in increasing numbers. (Schooling is dependent on paying fees, which previously many could not afford).

Essential items, such as hygiene products, are more readily available because of the community’s greater buying power. The local Medical Officer, in discussions with the project leaders, has reported an improvement in village health since the project began.

The success of the project has meant increased supplies of Waria Waria oil, with supermarkets and pharmacies in major centres now stocking the product.

Like supply, talk about the benefits of village oil production is increasing too. At a field day in Tabubil (in the North Fly area) in November 2004, information on the possibilities of oil production was presented and distributed through brochures and flyers.

Although it is still early days, villagers in Western Province are beginning to find that a sustainable, cash-generating local industry is achievable, and that through this income a better life is possible.

With the conclusion of the current ACIAR project in Western Province, the Livelihood Programs Department of Ok Tedi Mining Ltd will be providing logistical support and marketing assistance to aid the economic sustainability of this fledgling village-based essential-oil industry.

The strong level of local ownership and value of the returns on offer are promising a flow of benefits as long as the Waria Waria oil continues to flow, and that could be well into the future.

Training the trainers in Papua New Guinea

Courses will open up new fish-farming opportunities, reports Geoff Wilson

When fisheries and aquaculture lecturer Ursula Kolkolo returns to Port Moresby in April 2007, she hopes to set up education programs that will help improve Papua New Guinea's food security at village level.

Courses she will help develop at the University of Papua New Guinea (UPNG) will target opportunities for new village-level and commercial fish farming and fisheries in PNG.

Meanwhile, Ms Kolkolo is on study leave in Australia studying for a doctorate degree in aquaculture from James Cook University (JCU) in Townsville, Queensland, as an ACIAR John Allwright Fellow.

She began her PhD topic – Settlement cues in post-larval development of the mud crab – with mud and sand crab culture work at JCU in December 2003.

While also furthering JCU's research, Ms Kolkolo's work will better equip her to teach a spectrum of aquaculture skills when she returns home. The training will also provide the basis to start crab-farming courses if resources at UPNG allow.

She believes that broad training in modern

aquaculture is needed so villagers can enjoy higher levels of protein in their diets.

About 90 percent of PNG's population of nearly 5.2 million people live in rural areas and grow their own food. Up until now, the major animal food protein has come from pigs in the highlands and fishing on the coast. Farmed fish, crustaceans and shellfish could become important alternatives for a healthier and more varied diet.

Capture fisheries are already a major industry in PNG, with its large and rich Exclusive Economic Zone (EEZ) recognised for opportunities in tuna fishing and processing, deep-sea and reef fishing, plus rock lobster and prawn capture with on-board processing.

ACIAR recently funded a review of village-based farming using carp and other species, and found that there was a need for training to help develop village-scale aquaculture.

Commercial and village-level opportunities in aquaculture are increasingly being recognised as a means of providing protein from PNG's coastal and inland waterways. As a result, opportunities exist for farming introduced carp and tilapia fin fish; what is lacking is the knowledge of how best to achieve this.

Ms Kolkolo's work will help generate and disseminate knowledge that will allow villages to pursue goals like these. She is already well qualified to teach fisheries and aquaculture. In 1983 she obtained a science degree from UPNG and joined the fisheries research branch of the Department of Primary Industry, working with local reef fishermen in Port Moresby.

Ms Kolkolo was the biologist in charge of Torres Straits fisheries (barramundi, lobster and prawns) in Daru, Western Province, from 1986 to 1989, then in 1989 she obtained a master's degree in aquaculture from Simon Fraser University in Vancouver, Canada.

After returning from Canada, Ms Kolkolo continued working for PNG's National Fisheries Authority from 1993 to 1999, first as the principal scientist for inland fisheries and aquaculture, then as manager for fisheries research and management – before joining UPNG as a lecturer in fisheries biology in 2000.

Her PhD studies at JCU will equip Ms Kolkolo for the new program of fisheries aquaculture undergraduate courses expected to be set up at UPNG in Port Moresby, in response to the demand for aquaculture industries.

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Ursula Kolkolo holding a farmed mud crab at JCU's aquaculture research facility. With her is the head of JCU's School of Marine Biology and Aquaculture, Professor Rocky de Nys.