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## THE FULL POTENTIAL OF COCONUT

*Bill Lavers*

**A**s a tree crop with a highly versatile product range, the coconut palm remains an under-utilized resource. Comparatively low productivity levels and the vagaries of commodity markets hamper growth, while moves to improve productivity and profitability remain central aim.

During 2010, coconut oil prices almost doubled, from the less than US\$800/tonne – cost, insurance and freight price (CIF) from Rotterdam – in November/December 2009 to around US\$1,500/tonne in November/December 2010, and is within sight of the all-time high of US\$1,700/tonne reached in 2008. With world production also growing since 2007/2008, reaching and surpassing levels last seen in 2000/2001, demand is clearly on the rise.

However, compared to palm kernel oil – the other lauric oil in international trade – these production rises are small, and if the past is anything to go by, the price peak are unlikely to last for too long. For the most part, coconut oil remains a commodity business, and producers have taken the rough with the smooth; and the fundamental will not go away. Output of palm kernel oil grows on the back of the relentless expansion of palm oil production, while coconut oil continues to be hampered by almost stagnant production and productivity levels that are far lower than for oil palms.

Global coconut oil production was little more than 3.5 M tons in 2000/2001 and, according to latest US Department of Agriculture (USDA) figures, it grew from 3.46 M tons in 2005/2006 to 3.62 M tons in 2009/2010. It is projected to reach 3.67 M tons in 2010/2011,



based on increased copra production in both Indonesia and the Philippines. At this level, world coconut oil production represents just about 2.5% of total world oil output, marginally ahead of olive oil (which has reached the 3 M ton level in select years). In theory, at least, it could be so much more.

Globally, coconut palms are grown in over 90 countries on an area of more than 12 M ha, producing a total of more than 11 M tons of copra equivalent, to be exact, with just three – Indonesia, Philippines and India – accounting for the majority. However, actual copra output – that portion of the coconut crop that is processed for coconut oil – does not exceed 6 M tons. According to USDA figures, world copra output was 5.88M tons in 2008/2009 and could reach 5.96M in 2010/2011. This is partly because a large amount of the world coconut crop – even in India, Philippines and Indonesia, the major coconut oil producers – remains for local use, critical to the livelihoods and food security of millions in rural populations.

In terms of nut production, India is the world's largest producer – with

16.8 bn nuts in 2008, according to APCC – followed by Indonesia, Philippines, Sri Lanka, in that order. The Philippines remains the world's top producer of coconut oil (around 1.5M-1.6M tons/year), with Indonesia second, with production still below 1 M tons (950,000 tons this year, according to the APCC estimate), and India third.

### Productivity of Coconut Plantings

Despite many calls for increased productivity over the years, both coconut planting area and copra output have remained more or less static over the past five years or so. But, according to the major producing countries, potential for improved productivity is high. APCC recently estimated that 25-50% of the coconut stands in its member countries are senile and need replanting, having outlived their productive lifespan of about 60 years. On top this, many stands are damaged or have barren patches where trees have fallen and not been replaced.

As APCC says, this represents an opportunity for introducing better quality planting materials (new trees), especially in view of the R&D progress in all three major producing countries (Philippines, Indonesia, and India) that have led to impressive achievements in developing new hybrids and cultivars with very high yield potential.

According to the Philippine Coconut Authority (PCA) coconut yields in the Philippines from 2005-2009 have averaged 45 nuts/tree/year. In India – the world's top nut producer – the average figure has been put at 36 nuts/tree/year, equivalent to around 7000 nuts/tree/year. With the right cultivars and good management, it has been estimated that these yields could be increased to 120 nuts/tree/year. If such

improvement could be translated into derived copra and coconut oil, the result would be an almost three-fold increase on productivity on the same land area.

Other important improvement developed in the new varieties may also include better oil content and quicker maturing trees (as has happened with oil palms).

Clearly the potential is there, but coconuts are still largely small holder's crops, and the tree crops are a long term investment than annual crops, so a great deal of financial support is needed. As Romulo N. Arancon, Jr. Executive Director of APCC, has recently put it, "a strong political will and a firm commitment by all stakeholders – especially government decision makers – are needed to accelerate the coconut replanting programme" as formulated and signed by APCC members in 2006 as the PNG Declaration.

According to Arancon, the PNG Declaration needs to be implemented now; but there are other avenues for improving productivity and profitability, by increasing income and reducing costs in other ways. These include better management of plantations, incorporating good agricultural practice and new technologies, using low-cost input strategies and recycling biomass. Intercropping – by planting other cash crops along with coconut palms – and the integration of livestock rearing on plantations are other possibilities. Few of these ideas are new, but all are worth considering afresh.

For many years, coconut stands have been shown to ideal for habitats for high value vine crops, such as vanilla and black pepper, but recent suggestions include mixed cropping with tropical fruit and nut crops. Trees and shrubs including avocado, durian, mangosteen, pomelo, rambutan and macadamia nut have all been suggested as candidates worth a closer look.

Another initiative under investigation in India is intercropping with nitrogen-fixing trees and shrubs, as a way of bringing in bringing in fertilizer

nitrogen without the need to buy expensive chemicals. It is well known that leguminous plants such as peas, beans and clover, have root nodules inhabited by nitrogen-fixing micro-organisms, and so they are grown as rotation crops in conventional arable farming to reduce the need for expensive inputs. It is less well known, however, that there are some trees and shrubs – both leguminous and non-leguminous – that has these characteristic too, including some types of Acacia and Casuarina.

There are clearly many options to consider. At a recent international coconut conference in India, Dr. H. P. Singh, Deputy Director, of the Indian Council of Agricultural Research (ICAR), said it is "imperative that the yield of all of the crops in a coconut-based farming system be holistically exploited to maximize production (of all saleable products) per unit area."

#### Discovering New Potential

Other ways of increasing income in the coconut sector, of course, lie in diversification into other areas of the value chain. With respect to coconut oil, this now include biodiesel as well as fatty acids and oleochemicals, but these are still commodity-related to some extent. There is also higher value added to be had in the food sector, and in non-food products made from coir and coconut shell.

Along with coconut oil, desiccated coconut, coconut milk and coconut cream have been food products well known world over for more than a century – the Philippines and Sri Lanka are the world biggest desiccators – but there is now a new impetus in the food industry which represents great scope for coconut derivatives – that of health nutrition.

Clearly, Virgin Coconut Oil (VCO) has much to offer in this category, but there are now new possibilities with coconut based sweeteners and coconut flour. Coconut flour is made from defatted coconut residue from coconut milk and VCO production, which can be dried and ground. It is high in dietary fiber and gluten-free, and therefore interesting for sufferers of celiac disease and gluten

intolerance. According to APCC's *Cocommunity* magazine, it can be used to make baked goods such as pancakes, muffins and pound cake – so long as "the right adjustments" are made – and also as a thickener for soups, stews and gravies. Recent research in India has also shown that coconut flour has performed well in bread type products where high gluten levels are important.

Coconut Sugar – a natural sweetener derived from coconut sap – has also been shown in PCA research to have low glycemic index of 35. But now, a new natural source sweetener derived from coconut – with just two-thirds calories of sugar and a glycemic index of 13 – is coming into the picture.

Toyota Tsusho, the trading arm of the Toyota motor company, has set up a joint venture project in Davao city, Philippines, to extract the natural sugar xylose from coconut shells. The project plans to produce 15,000 tons/year of xylose, which can then be converted – by hydrogenation – into xylitol, a polyol sweetener commonly used in confectionery and chewing gum. While many polyol sweeteners are described as "toothkind", xylitol is the only food ingredient polyol that is proven to actually inhibit the growth of dental bacteria.

So the option for diversification in the coconut product range continue to grow, and it is therefore becoming more important to consider the whole crop when looking to increase earning. "The coconut industry has to undertake a deliberate and focused shift to value-added products to increase export income," says APCC's Arancon.

A further dimension to gain momentum recently is that of "coconut tourism". With some moves of this nature already established in the Philippines and elsewhere, India's Coconut Development Board has now initiated a "Coconut Trail Project" in Kerala.

*Bill Lavers is Consultant Editor for Oils and Fats International.*

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