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Coconuts in the Mekong Delta

An Assessment of Competitiveness and Industry Potential



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Summary

55 billion nuts p.a.
world output

USD 6 billion
market

Ben Tre leading
growth of industry
in Mekong Delta

Evidence-based
insights

International
benchmarking

Oil and fresh
coconuts consume
92% of nuts

Introduction

The numbers surrounding the world coconut industry are substantial – 55,500,000,000 coconuts produced every year from 12,000,000 hectares supporting an industry worth USD 6 billion at wholesale. Yet despite the size and wealth of the industry most coconut growers are among the poorest in their society and over 1 million tonnes of coconut dust are dumped into the environment every year.

In the Mekong Delta, riverbanks shaded with coconut trees are an iconic part of the landscape, but only in the last decade has the local coconut industry taken the first steps to becoming a modern, competitive industry. Much of this recent development has happened in Ben Tre province, at the heart of the industry in the Delta with the greatest concentration of coconut trees and businesses. The Ben Tre authorities and industry leaders are now looking to help the industry mature into an internationally competitive and sustainable coconut industry that maximises the value created for the local community, businesses and coconut farmers.

This study is part of that process and aims to provide evidence of the current state of the global coconut industry and the local industry in Ben Tre and the wider Mekong Delta and to assess specific opportunities for the industry's future development. The study also identifies several promising commercial opportunities for local coconut businesses and the impacts these could have on the company's own bottom-line profits as well as the wider industry. It supplements extensive secondary data with insights and evidence gathered through an international benchmarking exercise with leading competitor countries, including the Philippines, Sri Lanka and Thailand as well as the local industry in Ben Tre.

The world coconut industry

The world consumes its coconuts as oil (55%), fresh (37%), desiccated (5%) and a small amount of a long list of other products (by volume). The annual wholesale value of the coconut sector can be estimated as approximately USD 6 billion for 2006 comprised of; coconut oil USD 2.9 billion, fresh nuts USD 2.2 billion, desiccated coconut USD 0.3 billion, other kernel products USD 0.3 billion, husk products USD 0.3 billion, shell products USD 0.1 billion.

Table 1: World coconut market volume, 2006

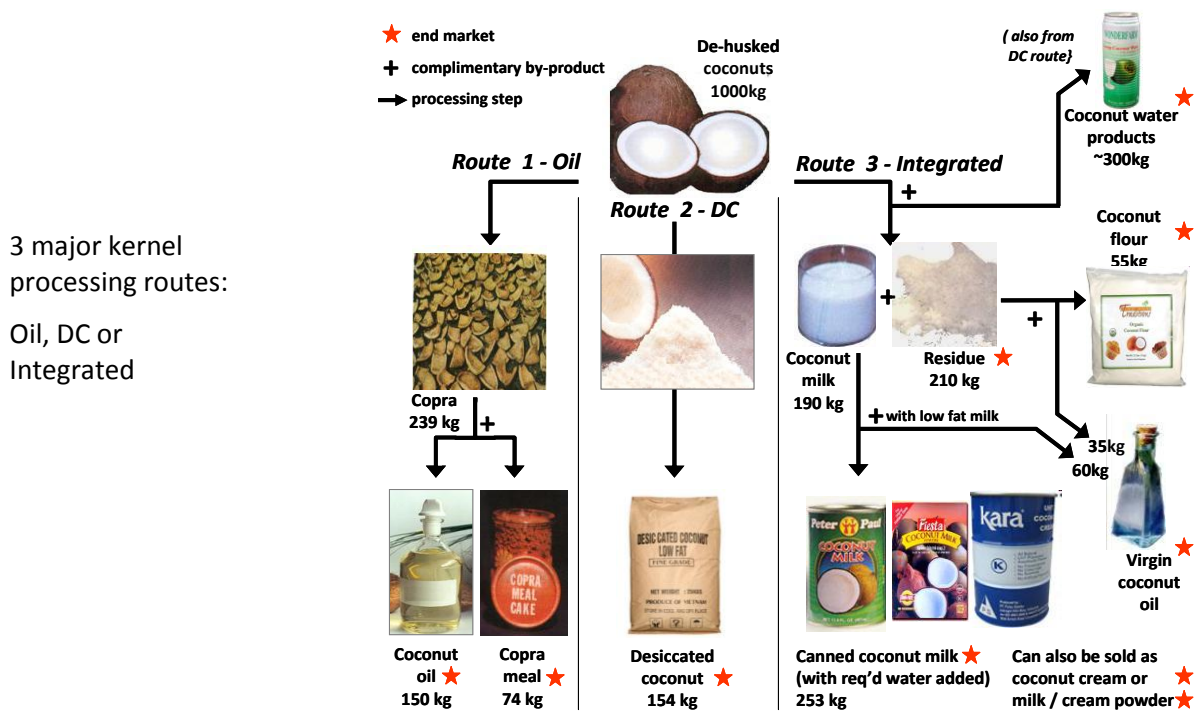
Markets	Products				
Nuts millions (%)	Total	Oil	Fresh nuts	Desiccated	Other
Total	55,500 (100%)	30,269 (55%)	20,371 (37%)	2,666 (5%)	2,193 (4%)
Export	23,310 (42%)	18,852 (34%)	242 (0.5%)	2,378 (4%)	1,838 (3%)
Domestic	32,190 (58%)	11,417 (21%)	20,129 (36%)	288 (0.5%)	356 (1%)

Domestic market most important	Domestic markets in producing countries dominate world demand, consuming around 58% of all nuts each year with a value of USD3.8 billion. Thus, India, Indonesia and Philippines are the biggest coconut consumers, with Brazil and China the fastest growing markets.
Export markets dominated by oil and DC	Export markets were worth approximately USD 2.3 billion in 2006, consuming 42% of nuts and are dominated by kernel products. For kernel products, 97% of all exports (in nut equivalent) were in the form of oil (82%), copra ¹ (4%) and desiccated coconut (11%). In volume terms, coconut meal is a major by-product from oil production and is consumed for animal feed in domestic and export markets. In terms of other kernel products, coconut milk is one of the largest volume high value products, with an estimated annual market volume of 150,000 - 250,000 MT and growing.
Yet sizeable markets for coconut milk in absolute terms	Sales of husk products are equivalent to the husks from approximately 5 Billion nuts per year – just 9% of all available husks. Major products are coir yarn, rope, matting and mats. Of these products, 60% by volume are consumed in domestic markets, mostly in India, and 40% are exported. Exports of husk products (mostly as coir products) and shell (mostly as activated carbon) are relatively small in value terms at approximately USD 210 million and USD 110 million, respectively in 2006. This is mainly due to the small amounts of available husks and shells that are processed in most countries. The notable exceptions to this are Sri Lanka, Vietnam and some areas of India and Thailand.
Just 9% of husks processed	In terms of unit value addition, kernel products are the most important in terms of industry level value creation. Kernel products on a commercial scale can achieve values of USD 300 / 1000 nuts or more. Husk products can also create significant value at commercial scale of around USD 90 / 1000 nuts while shell products can create USD 10-30 / 1000 nuts.
Only countries with good use of husk are Sri Lanka and Vietnam	In terms of supply, the Asia Pacific region accounts for 87% of global production, with the “Big Three” countries producing 76% - Indonesia (16 billion nuts), India (13 billion) and Philippines (13 billion). Brazil is the fourth biggest producer (3.5 billion) and the only big producer outside Asia-Pacific. Sri Lanka, Thailand, Vietnam (and Ben Tre in particular) have good yields, of 5000 – 7,700 nuts per hectare per year compared to the world average of 4,676. Despite high yields, Thailand, Sri Lanka and Malaysia have seen significant falls in the coconut production area in the 5 years to 2006, of 31%, 11% and 28% respectively. Vietnam and India are the only two higher yield countries that have not seen recent declines in their production area.
Kernel products create most value per nut	
Husk products also valuable	
“Big Three” producer countries – 76% of nuts	
Indonesia, India, Philippines	

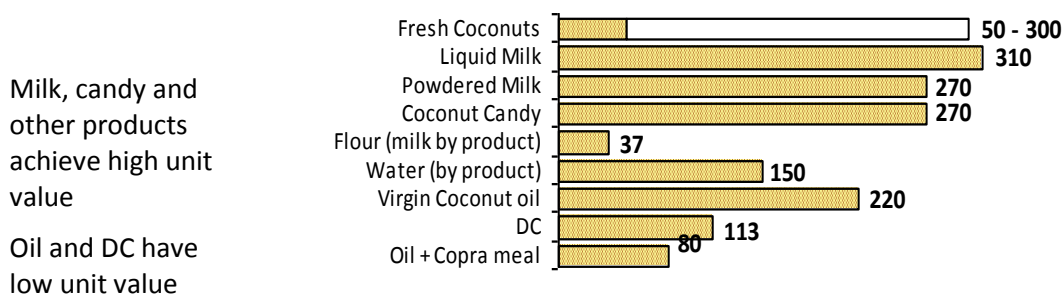
Kernel Product Industry

There are three main processing routes for different kernel products: the traditional alternatives of *Oil* or *DC* and the more recent *Integrated* kernel processing routes, as illustrated below.

¹ Copra is an intermediary product in oil production and exports fell by 66% between 1996 and 2006 as countries processed into oil directly themselves.

Figure 1: Major kernel processing routes, selected products²

Oil and desiccated coconut are the main products sold in volume terms, as outlined above. However, in terms of unit value, these are low value commodity products. A number of other products available through integrated processing achieve significantly higher unit value per coconut (see Figure 2) and several products can be produced and sold in parallel. This enables competitive businesses to achieve in excess of USD 300 per 1000 nuts and often much more through integrated kernel processing.

Figure 2: Unit value³ - selected kernel products (USD/000 nuts)

Husk product industry

Husk markets have two main segments: husk fibre and coconut pith. These are independent end markets but coconut pith is an unavoidable by-product

² Numerous product variations and manufacturing arrangements exist in real businesses. The diagram illustrates some of the main products from each processing routes.

³ APCC reported international averages, 2006. Coconut candy and fresh coconuts based on data collected in Ben Tre. For coconut candy, the value shown is the price paid for the fresh nuts by the candy companies as the cost of the coconuts is less than one third of the total cost of goods sold.

	of husk fibre production. If fully utilised, husk products can generate approximately USD 130 per 1000 nuts - significantly more than DC (USD113) or Oil and copra meal (USD80).
India biggest fibre producer and consumer	India is the world's largest producer and consumer of coconut husk fibre products, with total annual production of around 435,000 MT of products, 80% of which are sold domestically. The three other major husk fibre producers are Sri Lanka, Thailand and Vietnam – all of whom export around 90% of their products. The main import markets are China, Netherlands, USA, Spain and Germany which accounted for 85% of imports in 2006. China is by far the largest importer, importing over 115,000 MT in 2006, or 45% of world imports. Husk fibre imports grew by an average of 11% per year from 2002 to 2006.
Fibre export markets in China, Europe and USA	
Only Sri Lanka and India export pith	The only two major exporters of cocopith are Sri Lanka and India, who accounted for 60% and 36% of total exports in 2006, mostly as substrate and coco peat. The major import markets are the EU, Korea, Japan and USA. These four countries accounted for 74% of total imports from Sri Lanka. The world substrate market is reported ⁴ to be growing steadily at 5% per year. Reported exports of coco pith products consume approximately 200,000 MT of raw pith. Despite these exports and similar volumes of domestic use, over 1 million tonnes of coco pith from husk fibre processing is unaccounted for every year, often being dumped into the environment.
Export markets growing in EU, Korea, Japan and USA	
	Shell product industry
85% of shell used in domestic market – most for fuel	Around 85% of shells are consumed domestically, mostly burnt as fuel. Only around 15% of the world production of shells are processed for export, with an estimated 8 billion shells processed in 2006. Of this, activated carbon accounted for 93% of total volume with the balance being mostly shell charcoal.
Activated carbon main shell export	The global production of all activated carbon is reported ⁵ to be 660,000 MT of which 120,000 MT is for water purification. Global coconut activated carbon production is reported to be around 130,000 MT, with exports of 120,000 MT.
Even activated carbon is relatively low unit value	The unit value generated from shell is relatively low even when processed, at just USD 10-30 per 1000 nuts. The export value of activated carbon creates around USD 18 per 1000 nuts and shell charcoal and shell powder create USD 14 and USD 33, respectively. Shell powder is an emerging product with promising applications as a resin and glue additive.

Industry issues

The four major issues in the coconut industry are currently:

Major industry issues	<ol style="list-style-type: none"> 1. Upheaval in the coconut oil industry 2. Low productivity and farmer income 3. Missed opportunities from not using the entire nut 4. Dealing with cocopith
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⁴ Interview with substrate company in Sri Lanka, February 2009

⁵ Interview with Haycarb, Sri Lanka, February 2009

Upheaval in the coconut oil industry

While coconut oil has been losing market share to palm oil in recent years, the strong growth in global vegetable oil consumption has made it possible for coconut oil to still sustain positive growth, albeit at around 2.5% per years. This is primarily from the industrial use market with food use all but stagnant, with growth of less than 1% per year.

Will stagnation turn to outright decline?

A major question for the entire coconut industry is whether or not the loss of market share to palm oil will accelerate in the coming years. If so, it is likely that the current stagnation of coconut oil in the edible oil segment could turn in to an outright decline.

This would most likely be triggered by a collapse in coconut oil use by consumers in producing countries, especially India and Sri Lanka. Already, the domestic coconut oil industry is in crisis in both countries. Sri Lanka has introduced protectionist tariffs to restrict imports of palm oil to support the domestic coconut oil industry – at the expensive of the export industry and local consumers. Such measures appear to be unsustainable over the medium term. In India, Kerala's coconut farmers are protesting at the collapse in coconut prices.

How will major producers respond to the current crisis?

The planned response of the Philippines oil industry to the competition is to attempt to dramatically increase the yield of coconuts at the farm level. If successful, this plan would greatly increase nut supply, lower nuts prices and allow the oil millers to produce more oil at lower cost. For the millers this would help address their over capacity problems, and raise their competitiveness. The benefit to the farmers is unclear.

Will the crisis trigger a major restructuring of the industry?

Either a collapse in domestic coconut oil consumption in producing countries or a surge in yields in a major producer like the Philippines would result in a significant shift in the balance of supply and demand for nuts in the entire coconut industry, equivalent to up to 20% of annual world coconut production. Changes on this scale would have far reaching consequence. Nut prices would fall, but initially unevenly between countries. Production would shift to lower cost producers and coconut farmers worldwide would see lower income and there could be an accelerated reduction in coconut production in badly affected areas.

Current crisis is set to last

These changes would be slow and painful and the exact impact is hard to determine. What is clear is that the current crisis is set to continue.

Low productivity and farmer income

The relatively low productivity at farm level, combined with low farm gate prices in several major producing countries, especially the Philippines and India, is a major long term weakness of the industry.

Farmers gain little from the coconut industry

In the Philippines, coconut farmers are regarded as being among the poorest with few alternatives. In other producing countries, such as Malaysia and Thailand, the low income from coconuts has driven farmers to switch to other more profitable crops and an overall decline in the local coconut industry.

Missed opportunities from not using the entire nut

– Opportunities being missed

A sustainable competitive advantage	<p>Globally, the coconut industry makes very poor use of anything other than coconut kernel meat. Millions of tonnes of potentially valuable material, from husks, shells or water, are thrown away every year.</p> <p>At the same time, the value achieved per nut is low and coconut farmers struggle to make an acceptable living. This is especially true at the moment with the crisis in the coconut oil markets.</p> <p>Efficient use of the entire nut in a local coconut industry could triple, or more, the value created compared to simple DC or oil supply chains. While market limitation mean that this is not possible for the entire global industry, those local industries that succeed in making the transition to an efficient industry will create a sustainable competitive advantage for themselves and deliver significant benefit to their business and farmers alike.</p>
Necessary for competitiveness	<p>Dealing with cocopith</p> <p>The most successful industries in the future will be those that have integrated kernel processing in tandem with good use of husks and shells.</p>
Best opportunities in Vietnam, India and Thailand	<p>Proper use of cocopith within a local industry is therefore not only necessary to avoid major environmental pollution but is a necessary part of developing an internationally competitive coconut industry. Vietnam, India and Thailand have the greatest opportunities in the immediate future to benefit from this.</p>
Many examples of successful businesses	<p>Examples of best practice at a company level</p> <p>Individual businesses are proven examples of the commercial strength of higher value added business models and industry strategies. Notable examples include Sambu Group (Indonesia), Renuka Group (Sri Lanka), Peter Paul Philippines, Wonderfarm (Vietnam), Tropicair (Sri Lanka) and Hayleys Export (Sri Lanka) as well as numerous Thai and Malaysian companies. Many of them share the same common themes:</p>
Common themes for success	<ul style="list-style-type: none"> • For kernel processing, the most successful businesses: <ul style="list-style-type: none"> ○ have incrementally evolved integrated processing business models, often starting as simple DC or oil millers ○ differentiate their products through integrated processing and a continuous process of diversification ○ now make, as a minimum, coconut milk/cream, coconut milk powder, as well as traditional desiccated coconut and defatted coconut (residue). ○ have added coconut drinks and virgin coconut oil to their product range more recently ○ still retain production of original products, eg. DC, but with profit growth driven by investment in high value products ○ can thrive, even in higher cost local industry, if using an integrated processing business model • To maintain competitiveness, research and development, quality control, and customer service are major focuses of businesses in all three sub-sectors

- International distribution networks are essential and Joint ventures (or long term relationships) with partners in end markets are often an important part of the success of export led companies
- Domestic markets also have potential, if marketing activity is properly addressed
- Manufacturing sites with good port access are an advantage
- Businesses need to be of a medium scale, providing them:
 - management capacity to access export markets
 - sufficient volume to support a diversified product range
 - production volumes to achieve processing efficiency
 - resources to invest in ongoing product development

Lessons from the rest of the world

The key conclusion: Move quickly to a high value-added industry

Ben Tre must move to a high value added industry

The most striking conclusion is that there is both an opportunity and an increasingly urgent need for the coconut industry in Ben Tre, and the wider Mekong Delta, to move up the value curve and become a high value-added industry.

The opportunity

Sizeable markets for higher value products

Sizeable markets exist for a range of high value products from all parts of the coconut, both domestic and export. While small compared to the main coconut commodity markets, they are sufficient to provide good market opportunities for an industry of the size of Ben Tre.

Target integrated kernel processing and full use of husk

The local industry could realistically raise the value added per 1000 nuts from its current level of USD 250 towards USD 520, by investing in the manufacture of commercially proven higher value products through integrated processing of the kernel and full utilisation of the husk fibre and pith for finished products and the shell.

Table 2: Output from a 100 million nut per year industry⁶

Could realistically double value added to USD520/000 nuts

2006 International average export prices	Product	000 nuts /MT	USD /000 nuts	Output MT per year	Total value USD p.a. FOB
Kernel	Coconut milk (liquid & powder)	4.0	290	25,000	29,000,000
	Residue for animal feed	6.0	37	16,800	3,700,000
	Water - 33% of available water	4.2	50	7,920	5,016,000
Husk	Coir yarn	9.0	68	11,086	6,800,000
	Pith	3.9	62	25,873	6,200,000
Shell	Charcoal	19.7	13	5,076	1,312,000
Total			520	91,755	52,036,000

⁶ By comparison, Ben Tre produces around 310 million nuts per year

The need

Ben Tre is a high cost producer

Not competitive in coconut commodities: DC or Oil

Need to compete on value added not lowest cost nuts

Need to sustain higher farmer income for supply security

As well as the opportunity, there is an increasing urgent need. The current industry has high nut costs by international standards and is not competitive in the mainstream commoditised coconut products of DC and Oil, especially in relation to the very large, low cost production capacity in the Philippines and Indonesia. These problems will be further aggravated by the upheavals in the coconut oil markets.

High value added industries, outside of the commodity markets, will be best placed to withstand the harsh market conditions within the mainstream markets in the coming years – as their competitive advantage comes from the efficiency of utilisation of the entire nut for value added products and a diversity of end markets, as opposed to simple competition on the lowest price of a nut.

In addition to the pressure for market competitiveness, maintaining higher farmer incomes is important for the security of raw material supply. The two most effective mechanisms for achieving this are intercropping and moving to an efficient, high value added industry that can still be competitive even with higher nut prices

Ben Tre well placed as an industry to take the opportunity

The existing conditions in Ben Tre are favourable to moving to a high value added industry:

Ben Tre well placed

- Existing DC businesses interested in diversifying
- Some proven high value product companies
- Established domestic demand for some products

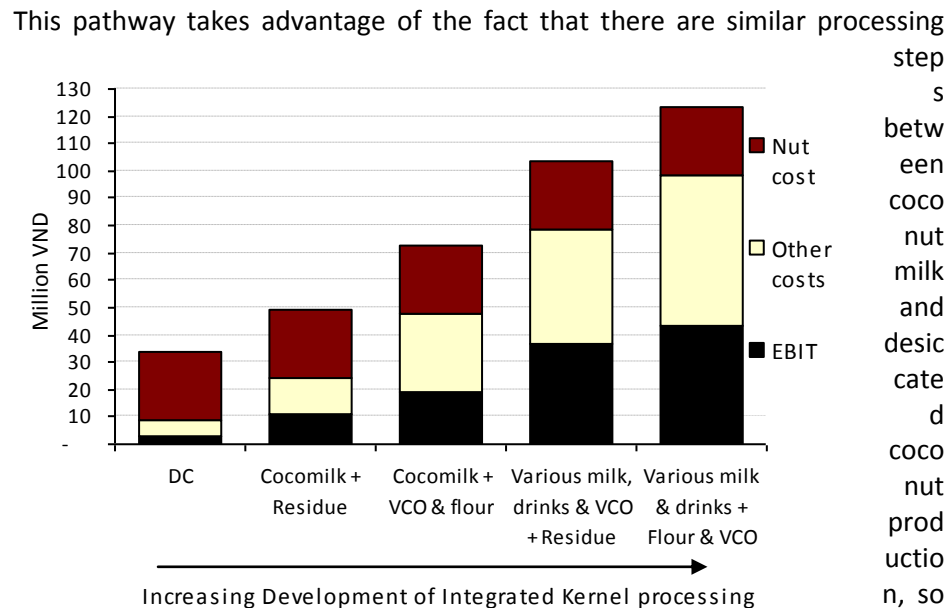
- There is a sizeable and stable domestic demand for coconut candy – a high value product – already consuming over 130 million nuts per year.
- There are already examples of successful integrated kernel processors in Vietnam, serving both domestic and export markets (e.g. Wonderfarm)
- Ben Tre has recently succeeded in attracting foreign investment into similar new integrated processing factories
- Several DC businesses operate in Ben Tre and have already expressed interest in investing to diversify into integrated processing businesses
- Vietnam already has established demand for coconut residues for feed, currently being imported from the Philippines, that would be a by-product of integrated kernel processing by the local industry
- A few smaller businesses have already proven the market for high value finished husk fibre products and pith products and nearly all husks already enter the processing industries (although not yet for these high value products)
- There is a rapidly improving business environment and infrastructure, with HCMC now just 2.5 hours by road and a highway under construction.

Commercial interests strongly aligned to industry interests

Most of the modern, integrated kernel processing businesses began as desiccated coconut processors or oil millers. They gradually added related product lines to make them the big integrated coconut processing enterprises that they are today.

The commercial benefits of this business strategy are self evident. At current market prices, a DC business processing 10,000 nuts per day could increase its profits (EBIT⁷) from around VND 3 million per day (approx. USD 180) to around VND 10 million (approx. USD 615) by investing an additional USD 60,000 – USD 100,000 to take the first step towards integrated kernel processing, initially selling coconut milk and residue. With an incremental investment of around USD 0.5 – 0.7 million, and a move to full integrated production of high value products, daily profits could rise to over VND 40 million (USD 2285).

Figure 3: Rising profits with increased integrated processing⁸



Big increases in profitability are possible from integrated processing

Proven business growth route

Similar production lines for easy migration from DC to integrated processing

Technology available "off the shelf"

In Ben Tre, total household income from industry p.a.

VND 1,100 billion
~ 70% on-farm

⁷ EBIT – Earnings Before Interest and Tax

⁸ Values are per 10,000 nuts processed – a typical daily amount for a small-medium scale factory with a throughput of 3 million nuts per year. Estimates use current prices for finished goods & estimates of costs of good sold from company interviews and team research.

	industry which employs an estimated 19,000 workers in Ben Tre (excluding on-farm labour).
Competition and higher value added should raise coconut prices and create jobs	With greater value creation and strong competition in the local industry, farm gate prices for coconuts can be expected to rise. An increase in farm gate prices is likely to be the most important mechanism for poverty impact, given that on-farm sales income is the most important mechanism for local household to benefit from the industry and that coconut farmers are poorer than the rural average in Ben Tre.
Rising coconut prices reduce poverty	Increases in farm gate prices of coconuts will lead to higher household income for coconut sellers without addition costs or labour and therefore, across the populations, a reduction in poverty rates.
Combined impact from:	Estimates of the combined impact of an improved coconut industry in Ben Tre from increased on-farm incomes ⁹ and new job creation ¹⁰ can be estimated to be in the order of:
On-farm income	+ 35,000 – 70,000 people of out poverty ¹¹ , on-farm from a sustained average increase in coconut prices of 25%-50%, respectively
Off-farm jobs	+ 5,000 – 10,000 new FTE jobs off-farm, mostly in additional husk fibre processing

Industry strategy recommendations for Ben Tre

Strategic goal	The goal for the Ben Tre coconut industry should be to become an internationally competitive and sustainable coconut industry that maximises the value created across the industry for businesses and coconut farmers, through profitable businesses, employment creation and attractive and stable coconut prices for farmers.
Industry objectives	<p>The objectives for the overall industry should be to:</p> <ul style="list-style-type: none"> a) Maximise the value-added across the industry by greatly expanding production of higher value products, especially from the kernel, husk fibre and pith, b) Sustain a healthy level of competition among coconut buyers and processors, c) Ensure raw material supply security by generating attractive incomes for coconut growers, and d) Ensure the environmental sustainability of the industry, in particular by addressing pollution from various sub-sectors. <p>Twenty two priority actions are recommended across the industry to achieve these objectives.</p>

⁹ On-farm poverty impacts based on VHLSS06 data. Note that this analysis does not assume any increase in the volume of nuts sold or yields.

¹⁰ Job creation estimates are based on actual numbers of workers and factory capacities from interviews with business in Ben Tre, Sri Lanka, the Philippines and Thailand for target products gathered, supplemented with data from manufacturing experts on labour input needs for different manufacturing processes

¹¹ against a \$1.25 PPP extreme poverty line

1 Introduction

Riverbanks shaded by coconut trees are an iconic part of the landscape of the Mekong Delta. Yet only in the last decade has the local coconut industry taken the first steps to becoming a modern, competitive industry. Much of this recent development has happened in Ben Tre province, at the heart of the industry in the Delta with the greatest concentration of coconut trees and businesses.

The Ben Tre authorities and industry leaders are now looking to help the industry mature into an internationally competitive and sustainable coconut industry that maximises the value created for the local community, businesses and coconut farmers.

This study is part of that process and aims to provide clear evidence of the current state of the global coconut industry, the status of the local industry in Ben Tre and the wider Mekong Delta and to assess specific opportunities for the industry's future development.

As well as providing evidence for local policy makers, the study also identifies some promising commercial opportunities for local coconut businesses and the impacts these could have on the company's own bottom-line profits and also on the wider industry.

A central part of the study has been a detailed international benchmarking exercise, in which the project team has met business leaders and policy makers in world leading industries in the Philippines, Sri Lanka and Thailand as well as in Ben Tre. The insights and lessons from these industry conversations have been supplemented by extensive analysis of external published reference data and a series of technical research studies prepared for the project and available separately (see Bibliography).

This report begins by providing an overview of the world industry and specific insights on the major sub-sectors. It then provides profiles of The Philippine, Sri Lankan and Thai coconut industries followed by a similar assessment of the industry in the Mekong Delta and Ben Tre in particular.

The following chapter provides a series of examples of successful “real world” coconut businesses that serve as benchmarks to aspire to.

The final three chapters of the report draw out the key insights and lessons from the rest of the industry for Ben Tre. A quantitative analysis of the potential impacts of the industry is provided and finally a series of priorities and objectives are proposed for the industry strategy in Ben Tre.

The study has been managed jointly by the Ben Tre Investment Promotion Centre and Prosperity Initiative.

2 The world coconut industry

2.1 World coconut supply¹²

55 Billion nuts p.a.
world output

The world's total coconut production¹³ was an estimated 55.5 billion nuts in 2006, or 10.7 million MT of copra equivalent, slightly below the 5 year average of 57 billion nuts.

“Big 3” grow >75%
Indonesia, India
Philippines

The Asia Pacific region accounts for 87% of global production, with the “Big Three” countries producing 76% - Indonesia (16 billion nuts), India (13 billion) and Philippines (13 billion). Brazil is the fourth biggest producer (3.5 billion) and the only big producer outside Asia-Pacific.

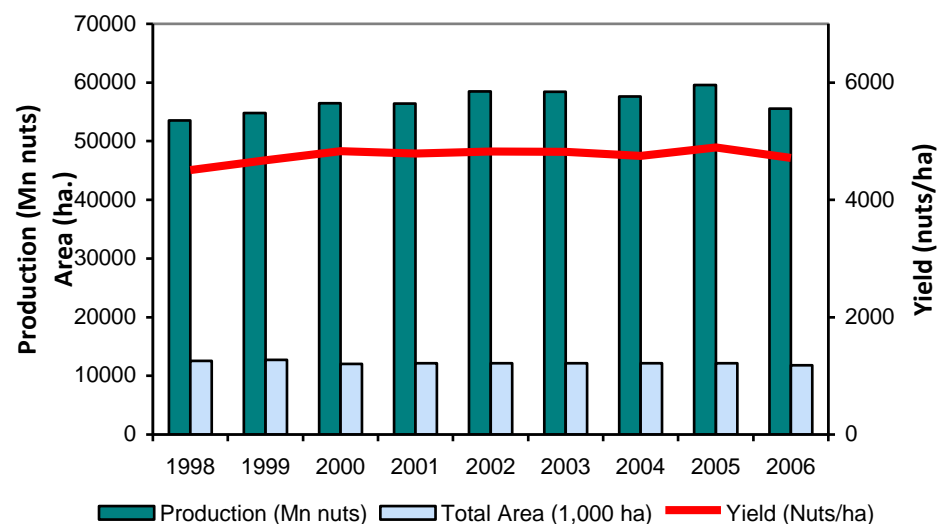
12 million hectares
coconut production
with stable area

Over the past ten years, the world coconut area has remained stable at around 12 million hectares, although with a small overall decline in total coconut cultivation area of less than 1% per annum. This decline is due to a variety of reasons, such as diseases, urbanization, and the emergence of other more profitable crops. The decline has been highest in countries such as Malaysia and Thailand with increasingly affluent populations.

Little yield growth

Global coconut production has been increasing slightly with compound annual growth rate (CAGR) of 0.47% since 2001, but with variation between years. The small positive growth is largely driven by improvement in the yield per hectare. There have been attempts by local authorities, agencies, businesses and associations in coconut countries to increase the coconut plantation productivity on land, but the yield increase is so far rather modest.

Figure 4:
Stable global coconut
production



¹² Data in this section is taken from the Asia Pacific Coconut Community (APCC) Yearbook 2006, unless stated otherwise.

¹³ Coconut production is typically reported as either nut equivalent or copra equivalent because different species and conditions produce nuts of varying size and composition. When considering use of whole nuts, the nut equivalent data is arguably most relevant. When concerned with using just the kernel, eg. for oil in Philippines, then the copra equivalent measure is most relevant. Through the later sections of this paper nut equivalent values are used as the focus is on whole nut utilizations.

Global production is stable yet differences exist between countries.

The “Big 3”

High yields in India

Low yields in
Indonesia and
Philippines

Stable areas

Mid-sized producers

Several have good
yields, including
Ben Tre

Large falls in area
in Thailand,
Malaysia and Sri
Lanka

Vietnam and India
stable and well
positioned

India is the most productive of the Big 3 producing countries at about 6,600 nut per hectare annual, while Indonesia and the Philippines have low productivity of around 4,000 nuts per hectare. In yield terms, India is on average 35% and 65% more productive in copra and nut equivalent, respectively, than Indonesia and The Philippines. While part of this difference can be explained in terms of agronomic conditions, varieties, age of trees and production practice, a major factor is the extent to which coconuts are grown in intercropping system with low planting densities – as in much of The Philippines.

All of the Big 3 countries have had relatively stable production areas since 2002, with The Philippines reporting a small increase in area while Indonesia a small decrease and India almost no change.

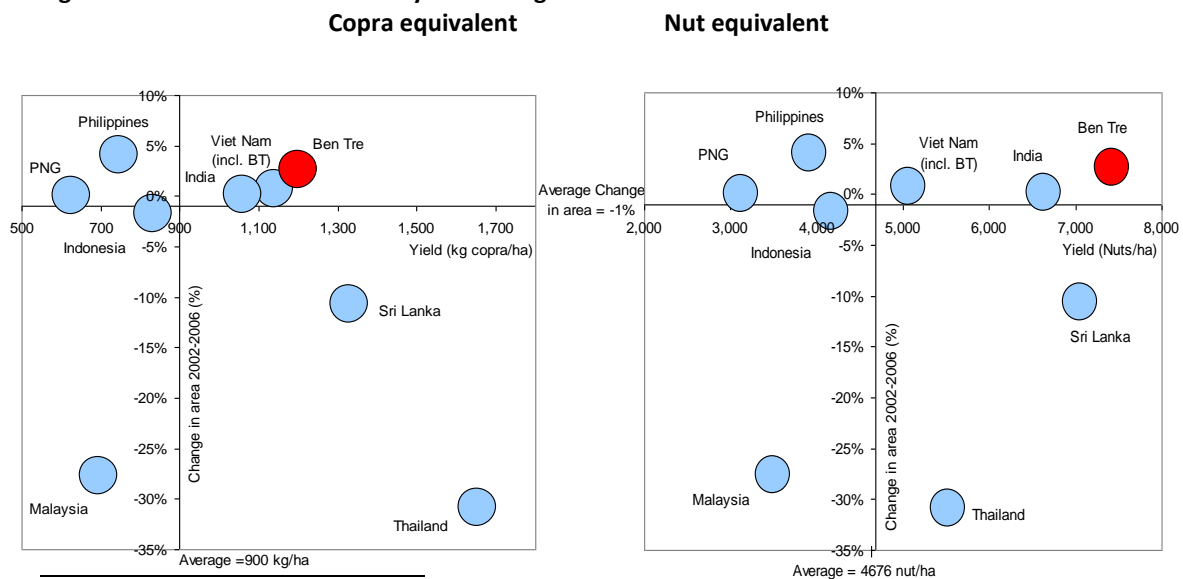
Sri Lanka, Thailand, Vietnam (and Ben Tre in particular) have good yields, of 5000 – 7,700 nuts per hectare per year. Malaysia and PNG have low yields of less than 3,500 nuts per hectare and are the least productive of the main producing countries.

Despite high yields, Thailand and Sri Lanka have seen significant falls in the coconut production area in the 5 years to 2006, of 31% and 11% respectively. Malaysia also saw a 28% drop in coconut area over the same period, and is now a large importer of coconut. In 2007 Malaysia imported 176 million nuts¹⁴, mainly from Thailand and Indonesia, as oil, copra and fresh nuts.

Vietnam’s coconut area stabilised since 2003 at 135,000 hectares, having fallen 36% from 1990 to 2003, as land was switched to higher value uses during its rapid economic growth, especially in the south.

Vietnam and India are the only two higher yield countries that have not seen recent decline in their production area. They are therefore well positioned in terms of their productivity competitiveness.

Figure 5: Difference in Productivity and Change in Area between countries



¹⁴ A. Sivapragasam, (2008) Coconut in Malaysia – Current developments and potential for revitalisation, Rice & Industrial Crop Centre, Malaysian Agricultural Research & Development Institute

Global yields
low at <25%-50%
of achievable
levels

Global average yields are low at 4,700 nut per hectare annually, mostly due to the drag of Indonesia and Philippines. It is notable that various research institutes¹⁵ suggest that more intensive management can give annual yields of over 10,000 nuts per hectare from traditional varieties and up to 20,000 nuts per hectare from improved varieties.

2.2 World coconut demand

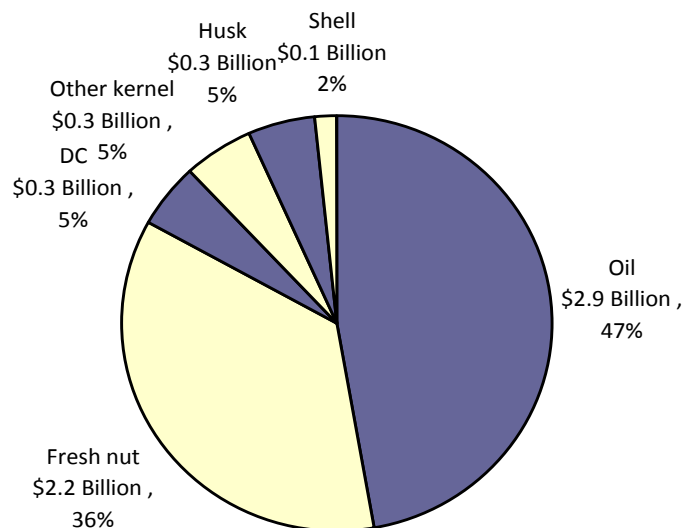
Oil and fresh nuts
dominate
world demand

The world consumes its coconuts as oil (55%), fresh (37%), desiccated (5%) and a small amount of a long list of other products (by volume)

The annual wholesale value of the coconut sector can be estimated¹⁶ as USD 6 billion for 2006 comprised of; coconut oil USD 2.9 billion, fresh nuts USD 2.2 billion, desiccated coconut USD 0.3 billion, other kernel products USD 0.3 billion, husk products USD 0.3 billion, shell products USD 0.1 billion.

Figure 6: World coconut market value, 2006

World market
value
USD 6 Billion



Domestic
markets consume
58% of volume
and 62% by value

Domestic markets in producing countries dominate world demand, consuming around 58% of all nuts produced each year with a value of USD3.8 billion. India, Indonesia and Philippines are the biggest consumers of coconuts, while Brazil and China are the fastest growing markets. In domestic markets, an estimated 63% of coconuts are consumed as fresh nut and 35% consumed as coconut oil. A range of other processed products are often also available, such as milk products or drinks. South Asia in particular produces and consumes large volumes of coir products made from coconut husks.

¹⁵ See Coconut Research Institute (Sri Lanka - www.cri.lk), Philippines Coconut Authority, Oil Palm Research Institute (Ben Tre, Viet Nam)

¹⁶ World market size estimates are based on APCC volumes, summarized in Table 1, and average market prices reported for exports plus local prices for main products in India as the basis for calculating the value of domestic markets – all data as per APCC Statistical Yearbook.

Only 9% of husks are processed

Sales of husk products are equivalent to the husks from approximately 5 Billion nuts per year – just 9% of all available husks. Major products are coir yarn, rope, matting and mats. Of these products, 60% by volume are consumed in domestic markets, mostly in India, and 40% are exported.

Table 3: World coconut market volume, 2006

Markets	Products				
Nuts millions (%)	Total	Oil	Fresh nuts	Desiccated	Other
Total	55,500 (100%)	30,269 (55%)	20,371 (37%)	2,666 (5%)	2,193 (4%)
Export	23,310 (42%)	18,852 (34%)	242 (0.5%)	2,378 (4%)	1,838 (3%)
Domestic	32,190 (58%)	11,417 (21%)	20,129 (36%)	288 (0.5%)	356 (1%)

Export markets annually worth USD 2.3 billion dominated by oil USD1.4 billion

Export markets were worth approximately USD 2.3 billion in 2006, consuming 42% of nuts annually and are dominated by kernel products. For kernel products, in 2006, 97% of all exports (in nut equivalent) were in the form of oil (82%), copra¹⁷ (4%) and desiccated coconut (11%). In volume terms, coconut meal is a major by-product from oil production and is consumed for animal feed in both domestic and export markets.

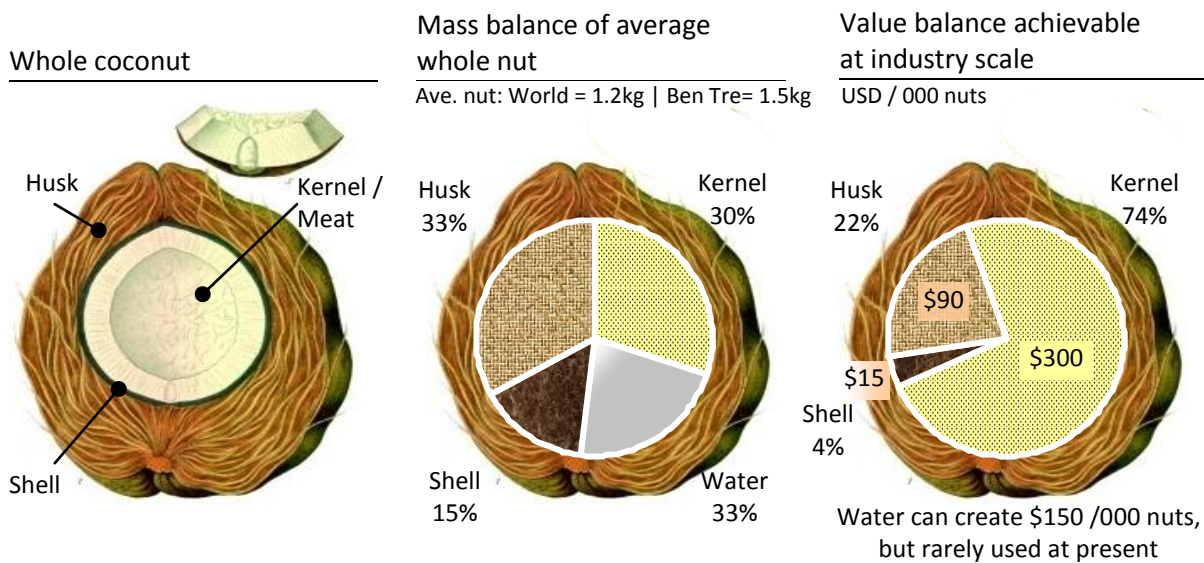
Husk and shell exports worth USD 0.3 billion annually

Exports of products from husk (mostly as coir products) and shell (mostly as activated carbon) are small at approximately USD 210 million and USD 110 million, respectively in 2006. This is mainly due to the relatively small amounts of available husks and shells that are processed in most countries. The notable exceptions to this are Sri Lanka, Vietnam and some areas of India and Thailand.

>1 million MT of pith may be dumped in the environment each year

The husk industry consumes around 5 billion nuts per year, serving both domestic and export demand. When processed into fibre, this volume of nuts produces around 1.5 million MT of cocodust or pith. World exports of coco pith products consume approximately 200,000 MT and a similar quantity may be consumed domestically. However, this suggests that over 1 million tonnes of coco pith is dumped into the environment each year – mostly in India, Vietnam and Thailand. Sri Lanka is the only country that has a well developed husked and pith industry consuming most of the available materials.

¹⁷ Copra is an intermediary product in oil production and exports fell by 66% between 1996 and 2006 as countries processed into oil directly themselves.

Figure 7: Coconut mass and value balance¹⁸

Coconut products can be grouped into 4 segments, based on the part of the coconut they are made from: Kernel products, Husk product, Shell product and Water products.

Kernel and husk products have most value

While each part of the coconut has a similar weight, kernel products are the most important in terms of industry scale value creation, with commercially achievable value of USD 300 / 1000 nuts or more. Husk products can also create significant value at commercial scale of around USD 90 / 1000 nuts.

Water is valuable but under-used

Coconut water products can be highly valuable in an industry as well as to individual businesses. However, while there are successful businesses selling coconut water products, the vast majority of coconut water is not currently captured and processed in the industry globally.

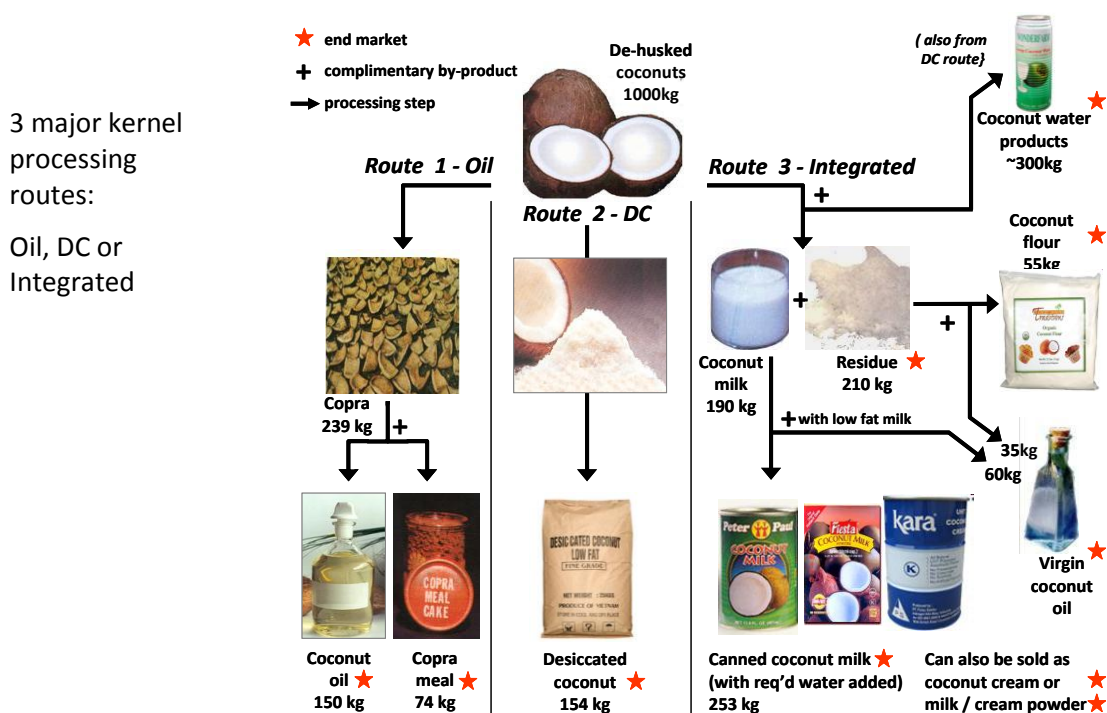
¹⁸ Value estimates assume full use of kernel, husk and shell using FOB price for typical commercial products. For Kernel products this assumes use for higher value products such as milk and flour through semi-integrated processing rather than lower value bulk products such as oil and DC. Source: APCC 2006, expert interviews, team analysis

2.3 Kernel product industry

2.3.1 Overview

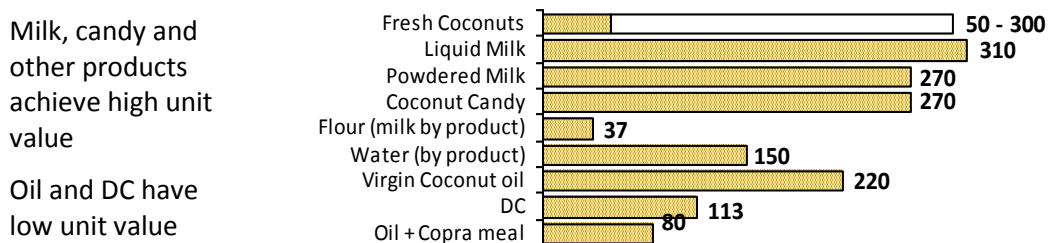
Coconut kernel can be made in to numerous products, many of which are complimentary by-products of each other. Three main processing routes exist in the industry – Oil, DC or Integrated processing. The combinations of some main products available from each route are illustrated below.

Figure 8: Major kernel processing routes, selected products¹⁹



Oil and desiccated coconut are the main products sold, as outlined above. However, in terms of unit value, these are low value commodity products. A number of other products available through integrated processing achieve significantly higher unit value per coconut.

Figure 9: Unit value²⁰ - selected kernel products (USD/000 nuts)



¹⁹ Numerous product variations and manufacturing arrangements exist in real businesses. The diagram illustrates some of the main products from each processing routes.

²⁰ APCC reported international averages, 2006. Coconut candy and fresh coconuts based on data collect in Ben Tre. For coconut candy, the value shown is the price paid for the fresh nuts by the candy companies as the cost of the coconuts is less than one third of the total cost of goods sold.

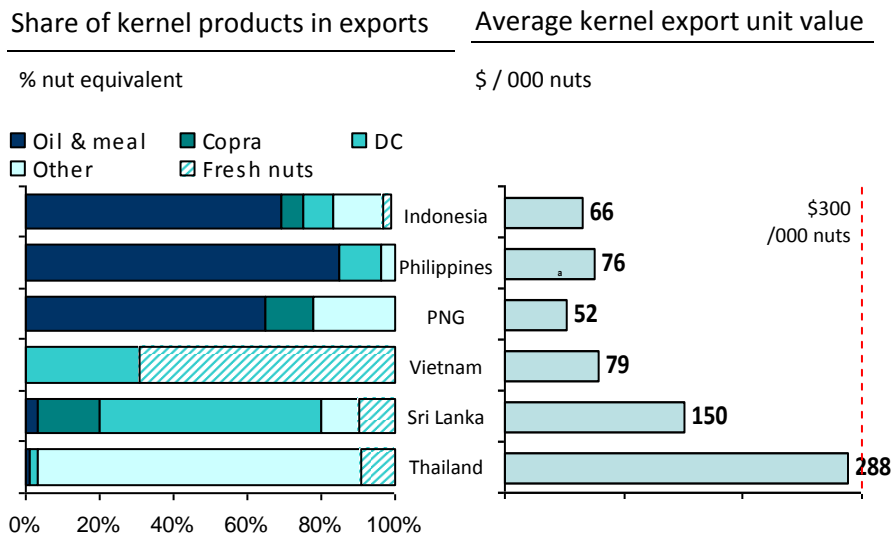
Integrated processing gives highest value		As several products can be produced and sold in parallel, competitive businesses achieve in excess of USD 300 per 1000 nuts and often much more (see Figure 7).
	Coconut oil losing market share, especially to palm oil	However, many businesses as well as entire sections of the coconut industry in some countries, focus on the production of low value commodity products of oil and DC. While necessary to find markets for the large volumes of products, this greatly reduces the unit value created by the industry.
Most industries achieve low value	Coconut oil productivity not competitive	It is notable that, at a national level, nearly all coconut industries achieve relatively low value from their kernel exports compared to that achieved by individual businesses using an integrated processing business model.
Medium size industries have best opportunity to achieve high value		Major exporters, such as the Philippines and Indonesia are unable to move large parts of their industry towards integrated processing due to market demand limitations and their scale of production. However, smaller and medium size industries, such as Thailand, Sri Lanka and Vietnam have a greater opportunity to raise the value they achieve by moving a significant part of their industries to integrated processing and higher value products.
Thailand, possibly Hainan, and individual businesses are good examples		At an industry level Thailand is perhaps the best current example of this for which some data is available. Anecdotally, Hainan Province in China may be another example. At a business level, there are numerous examples, such as Sambu Group in Indonesia that runs an integrated processing operation from a 100,000 hectare plantation.
	Industrial use driving small growth	

Figure 10: Kernel export product mix and unit value achieved²¹

2.3.2 Coconut Oil Markets

Coconut oil is used for human food, industrial applications and in animal feed. It competes in the vegetable oil market and its closest competing products are palm kernel oil and palm oil. Export and domestic markets are both important.

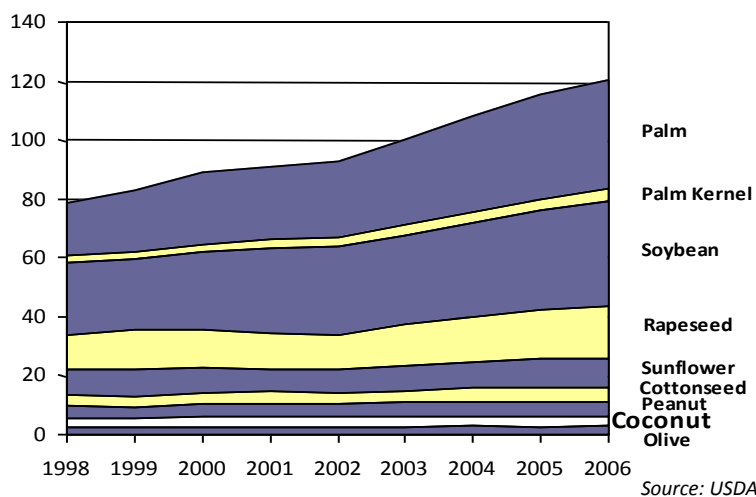
²¹ Based on APCC data, assuming de-husked nuts (fresh and mature). Export unit values calculated from export volumes and prices for fresh nuts, oil + meal, desiccated coconut and copra. Thailand value excludes 'other' as no data on prices or products available, but believed to be milk and drink products and as ingredient in other foods.



Coconuts oil's importance in the vegetable oil market is in long term decline dropping from 3.8% of the market in 1998 to 2.9% in 2006. From 1998 to 2006, total growth in coconut oil consumption of 19% lagged far behind the rapid growth in vegetable oil markets of 54%, with palm, soybean and rapeseed driving the growth.

Coconut oil's productivity of around 2,800 litres/ha. is not competitive compared to palm oil which produces 6,000 litres/ha.

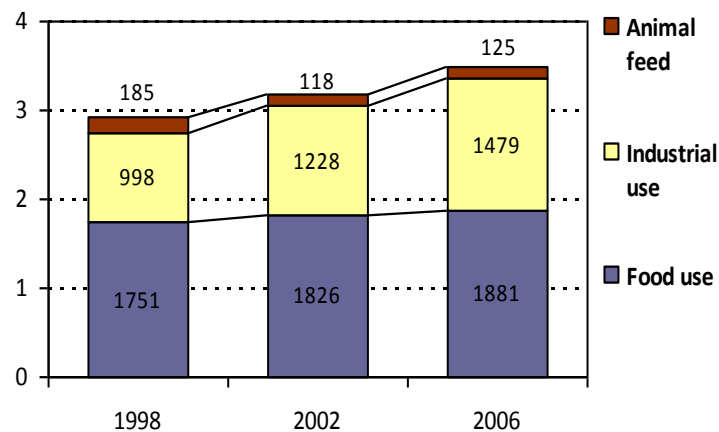
Figure 11: World consumption of vegetable oils (MT millions)



Yet, coconut oil use is still growing at an average of 2.5% per year, despite losing market share. The growth in the coconut oil market has been primarily driven by growth in industrial uses, which now represents 42% of market volume compared to 54% for food use.

Figure 12: Consumption of coconut oil by market segment (MT millions)²²

5 markets
accounts for 72%
of demand

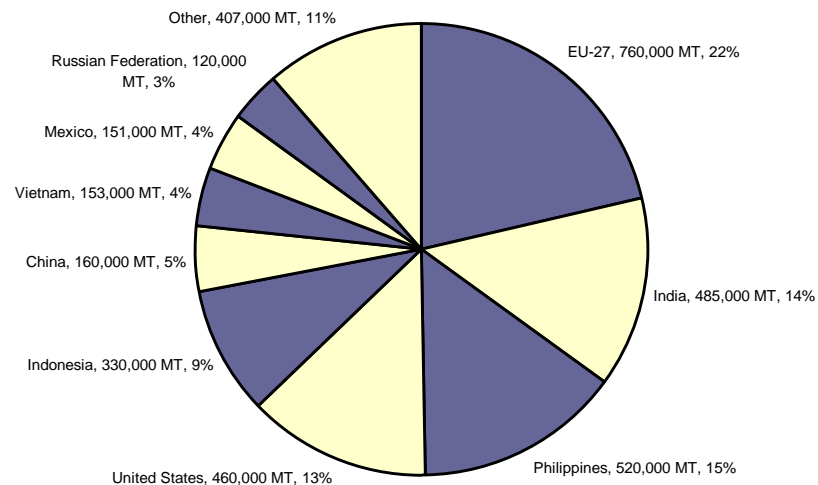


Source: USDA

Figure 13: Coconut oil markets by country

Copra meal is
major by-product
of oil production

Korea and
Vietnam biggest
importers



The major markets for coconut oil are the EU, India, Philippines, USA and Indonesia representing 72% of total demand. The EU and USA have been driving growth for industrial uses.

Copra meal markets

Philippine oil
mills run a <50%
capacity

Only industrial
use is growing

Copra meal is the major by-product of coconut oil production. It is high in protein and other nutrients and is valuable for animal feed uses. In 2006, 770,000 MT were exported, slightly below the 5 year average of 850,000 MT. The two biggest import buyers are Korea (407,000 MT) and Vietnam (102,000 MT) together accounting for 66% of copra meal imports in 2006. Vietnam is the fastest growing importer of copra meal in the world, with a 500% increase in imports in the five years to 2006. Europe used to be the biggest importer of copra meal until 2002, but since then imports dropped by 83% to 81,000 MT in 2006.

²² Differences exist in reported coconut oil consumption between USDA and APCC

Palm oil is
cannibalising
coconut oil
markets

Copra meal prices averaged USD 72 / MT FOB Philippines between 2004-2007 and then spiked at an average of USD 133 / MT in 2008.

Industry issues and outlook

Over capacity is significant across the coconut oil industry. Oil mills in the two biggest producers are running well below capacity²³: at 42% in the Philippines (2007) and 70% in Indonesia (2006). Yet despite this, there are few signs of any consolidation in the industry. In fact, Indonesia's production has increased in recent years, increasing competition within the industry.

Slow growth, mostly from industrial use markets in EU and USA, provides some opportunity for the industry, but is not sufficient to restore the industry to full scale production and is unlikely to off-set the loss of edible oil market share to palm and other cheaper oils.

Biofuel impact
may be limited
and only in
producing
countries

Competitive pressure from palm oil is now widespread in all markets. It is most acute in food and edible oil markets in more price sensitive coconut producing countries, including India, Indonesia and Sri Lanka, but is also present in industrial use markets. High commodity prices in 2008 further increased the pressure as buyers sought to limit costs by switching to cheaper palm oil. In the major domestic markets for oil in coconut producing countries coconut oil is now widely uncompetitive, and demand is only being supported by protectionist government policies (see profile of Sri Lankan industry).

Biofuel demand is a new area of significant domestic utilisation of coconut oil, particularly in the Philippines in the form of coconut methyl ester (CME) used as diesel fuel enhancer. Market demand is driven by clean energy legislation, such as the Philippines Biofuels Act which stipulates that a minimum of 2% Biodiesel (CME) shall be blended into all diesel engine fuels sold in the Philippines. At 2% blend, 140,000 MT of coconut oil are required – equivalent to between 10%-12% of annual production. This amount is equivalent to about one fifth of the over capacity in the industry and is also comparable to the variation in export volume of coconut oil that has moved back and forth between Indonesia and the Philippines each year over the last 5 years – for example from 2006 to 2007 Philippine coconut oil exports fell by 210,000 MT with a corresponding increase in Indonesian exports. The poor production competitiveness of coconut oil compared to other oils can be expected to limit the wider market opportunity for coconut oil as a biofuel outside of producing countries. Without further major initiatives in producing countries to increase demand, biofuel can be expected to have only a limited impact on the overall state of the coconut oil industry as major over capacity and pressure from palm oil will remain.

Higher value
niche markets
very small with
uncertain
demand

Higher value niche markets for coconut oil based products, such as virgin coconut oil (VCO), organic oil, glycerine and others are likely to continue to attract attention from the industry and can be expected to yield profitable opportunities for a small number of businesses. However, export markets

²³ Sources: Philippines data – United Coconut Association of the Philippines (2008) Coconut Statistics Annual 2007; Indonesia data - APCC (2007) Coconut statistical Yearbook 2006

remain very small, even by comparison to small and medium scale countries. The main market for VCO appears to be the domestic market in the Philippines. In export terms they are mostly immature with uncertain demand, increasing the risk for businesses trying to develop these markets. For example the dominate oil exporter, the Philippines in 2007 exported 16,500 MT of glycerine and 1,850 MT of VCO compared to total oil exports of 887,000 MT, equivalent to 1.9% and 0.2% of coconut oil exports respectively. Overall these niche markets can therefore be expected to make only a very small contribution to the industry in practical terms, despite much interest.

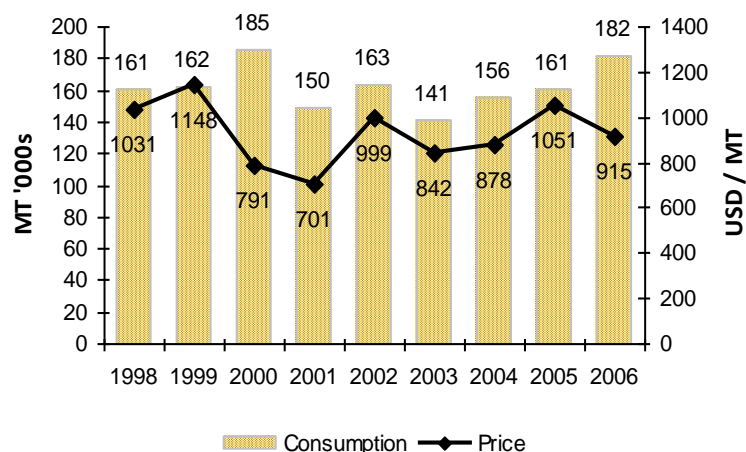
DC market
export led

2.3.3 Desiccated coconut markets

DC demand and
prices variable
from year to year

Desiccated coconut, or DC, is used both in the food processing industry, for example in bakery and confectionary, as well as being used directly by consumers. It is primarily an export led market. Although world consumption of DC grew nominally by 1.5% per annum over 1998 – 2006, the actual volume of DC consumption and price of DC varied significantly between years, with a possible recovery in demand in the recent years.

Figure 14: World desiccated coconut demand and prices



Demand driven
by high income
countries,
Singapore and
Middle East

The
main
import
marke
ts are
Europ
e (43%
by
volum
e),
USA
(15%),
Singa
pore

(13%) and the Middle East (9%). The Philippines is the dominant exporter with 50% market share by volume, followed by Indonesia (25%) and Sri Lanka (17%) with all three countries with long established industries. Vietnam is a recent entrant to the market with approximately 4% market share²⁴, reportedly gained largely in the Middle East at the expense of Sri Lankan exporters.

Several big DC
companies
moved to
integrated
processing

Despite relatively flat demand and historic over capacity in the industry, especially in the Philippines, there is currently not significant over capacity in the DC industry, for example Philippine DC mills are reported to be running at an average of over 90% of capacity in recent years.

Competition
increasing,
Sri Lanka and
Vietnam may
suffer

A significant factor in this has been that a number of bigger and more progressive DC companies have diversified into new products and more integrated processing business models. Examples include Peter Paul Philippines

²⁴ International Trade Centre – www.trademap.org

Ltd which has the world's largest DC mill and other major companies in Philippines, Indonesia, Sri Lanka, Malaysia and Thailand.

However, Indonesian businesses are reported to have been expanding production capacity in recent years to compete more directly with the Philippines. Vietnam's production capacity has also been growing.

This is likely to result in intensified competition in the industry and downward pressure on prices. Producers with higher raw material costs, such as Sri Lanka and Vietnam will find it increasingly hard to compete in this market.

2.3.4 Other kernel product markets

Coconut milk
high value
product

Other important coconut kernel product markets include those for milk products, water products and processed residues from coconut meat, such as coconut flour or defatted coconut. Information on the size and value of these markets is limited, in part because these products compete in other product markets such as drinks and beverages or are used as ingredients. Reporting on them is therefore more limited than on the major commodity products of oil and DC.

Milk products

Coconut milk
market
estimated at
150,000 MT –
250,000 MT p.a.

Milk products include a similar range of products to conventional dairy milk, such as low and full fat milk, cream, milk or cream powder, ice cream and more. When sold in as milk, coconut milk typically has around 20% water added to achieve the desired consistency. Coconut milk is made from grated coconut meat, pressed with or without water.

Coconut milk is a high value use of coconuts, generating over USD300 per 1000 nut equivalent. APCC market data is incomplete on coconut milk products, with only export data available and only to Philippines, Malaysia, Indonesia, Sri Lanka and Samoa. Notable omissions include data on all domestic markets as well as exports from Thailand, India, Vietnam, Brazil and other known exporters.

Valuable by-
product,
achieving
USD150/000 nuts

For the five countries covered by APCC data, reported exports are approximately 65,000 MT in milk equivalent²⁵. The Thai Ministry of Agriculture and Cooperative reports coconut milk production from approximately 290,000 MT of coconuts for both domestic and export markets, equivalent to an estimated 53,000 MT of coconut milk.

If it is assumed that the combined total of exports from the five countries reported by APCC and the Thai production represents from 50% to 75% of world production, this gives a crude estimate for the world coconut milk market of 150,000 MT – 250,000 MT per year.

Traditional
coconut water
products have
domestic
markets but
small exports

Water products

Coconut water products include, among others, coconut water drinks, vinegar and nato de coco²⁶. They can be a valuable by product from other kernel processing. For example, coconut water products had a wholesale price of

²⁵ converting actual tonnage for milk powder back to equivalent volumes of coconut milk

²⁶ a type of jelly made from by fermentation of coconut water

Growth markets for water in East Asia, including China	<p>approximately USD 640 MT FOB Philippines in 2007, equivalent to approximately USD 150 per 1000 nuts.</p> <p>Little data is available on the markets for these products.</p>
Coconut flour is by-product of milk production worth USD37/000 nuts	<p>Coconut vinegar and nata de coco have established domestic markets in some producing countries such as the Philippines, however reported exports are small. For example in 2007, Philippines reported export of Nata de coco of 4,500 MT and just 418 MT of vinegar. These are small compared to the assumed domestic demand where they are an established part of the local cuisine.</p>
Unrefined residue good animal feed USD+14/000 nuts	<p>Coconut water and drinks are now widely available in both domestic and export markets, with numerous manufacturers. Growth markets are reported to be in East Asia, including China as well as in USA and Europe. However, no reliable data has been identified on total market size or value as it is part of the beverages market.</p> <p>Coconut meat residues are by-products from integrate processing and are similar but higher quality than copra meal and can be processed for human consumption as flour or defatted coconut. Coconut flour is a high fibre, gluten free flour and can be used in similar ways to normal flour. Coconut flour has a market value²⁷ of approximately USD 850 per MT FOB, equivalent to USD 37 per 1000 nuts.</p>
<p>Husks very underutilized</p> <p>Two segments:</p> <p>1: Husk fibre</p> <p>2: Cocopith</p> <p>Together worth USD 130/000 nuts – more than DC or Oil</p>	<p>Alternatively, residues can be sold without further processing as a high quality additive to animal feed at a premium over copra meal that sells at approximately USD 72 per MT FOB, equivalent to USD 14 per 1000 nuts. The markets in which these products compete are very large and production volumes are likely to remain small in comparison. As such, market size is not expected to be a constraint to growth for these products in the foreseeable future.</p>
<p>India is biggest fibre consumer and producer</p> <p>Coir yarn worth USD 68/000 nuts</p>	<p>2.4 Husk product industry</p> <p>Husk product markets are estimated to consume the husks from approximately 5 billion nuts per year, around 9% of all available husks. It is therefore a greatly under-utilised part of the coconut. A total market value can be estimated as approximately USD 300 million. Domestic markets consume around 60% by volume but are worth, perhaps 35% by value.</p>
China, EU and USA are main fibre markets	<p>Husk markets have two main segments: husk fibre and coconut pith. These are independent end markets but coconut pith is an unavoidable by-product of husk fibre production. If fully utilised, husk products can generate approximately USD 130 per 1000 nuts - significantly more than DC (USD113) or Oil and copra meal (USD80).</p> <p>Husk fibre products include coir yarn, matting, mats, rope, rugs and carpets, bristle fibre, rubberised coir, mattress fibre and more.</p> <p>India is the world's largest producer and consumer of coconut husk fibre products, with total annual production of around 435,000 MT of products 80%</p>

²⁷ Source: Coconut flour - UCAP (2008) Coconut statistics 2007, Defatted coconut – CDA (2008) Sri Lanka coconut statistic 2007

2.3 MT of pith for every 1MT of husk fibre	of which are sold domestically. The three other major husk fibre producers are Sri Lanka, Thailand and Vietnam – all of whom export around 90% of their products. The average export price for coir yarn in 2006 was USD 613 / MT FOB India, equivalent to approximately USD 68 per 1000 nuts.
Big importers EU, Korea, Japan, USA	The main import markets are China, Netherlands, USA, Spain and Germany which accounted for 85% of imports in 2006. China is by far the largest importer, importing over 115,000 MT in 2006, or 45% of world imports. Husk fibre imports grew by an average of 11% per year from 2002 to 2006.
5% p.a. market growth	Coconut pith is the fine dust removed from the husk during fibre production. Its main applications are as a substrate or soil conditioner, for which its water retention characteristics and slow biodegradability, of around 20 years, make it ideally suited. For every 1 MT of husk fibre produced approximately 2.3 MT of pith are also produced.
Cocopith worth USD 62 /000 nuts	The only two major exporters of cocopith are Sri Lanka and India, who accounted for 60% and 36% of total exports in 2006. The major import markets are the EU, Korea, Japan and USA. For example, these four countries accounted for 74% of total imports from Sri Lanka.
Husk industry lost opportunity	The world substrate market is reported ²⁸ to be growing steadily at 5% per year. The competing materials to coco pith substrate products are peat moss and rock wool as growing mediums. The average export price for cocopith was USD240 per MT FOB Sri Lanka in 2006, equivalent to USD62 per 1000 nuts.
Sri Lanka most sophisticated role model	Husk industry issues There are two main issues related to the coconut husk industry: 1. Greatly under-utilised resources Husk products can make a very significant contribution to the value created by a coconut industry – and is potentially more value than either DC or oil production. However, they are grossly underutilised at present in almost every industry other than Sri Lanka and, to a lesser extent, Vietnam.
Pith disposal is major issue.	Both husk fibre and pith need to be used to obtain maximum value. At present only Sri Lanka achieves this on an industry scale. While not as big in absolute scale as India, Sri Lanka is arguably the most sophisticated husk industry in the world and the only major husk product producer that achieves nearly full utilisation of both the husk fibre and cocopith.
India, Thailand, Vietnam	2: Cocopith utilisation Even within the existing husk processing industries, the large imbalance between the volume of husk fibre production and cocopith use is a major issue. It is destroying value and polluting the environment. In terms of scale, it is currently primarily an issue in India, Thailand and Vietnam but present in almost all husk fibre industries.
>1MT per year may be dumped	Reported exports of coco pith products consume approximately 200,000 MT of raw pith. If it is assumed that that a similar quantity is used domestically this

²⁸ Interview with substrate company in Sri Lanka, February 2009

Variety of products

suggests that over 1 million tonnes of coco pith is unaccounted for every year. As pith takes around 20 years to breakdown naturally, it is typically left in very large mounds or dumped in rivers – creating significant pollution.

Activated carbon >90% of exports

2.5 Shell product industry

The shell obtained from the coconut is used for various products such as activated carbon, shell charcoal, shell powders, handicrafts, utensils, coconut chips, fuel and others.

85% shells used domestically, mostly for fuel and charcoal

Shell charcoal, activated carbon and shell powder are the most common export products. Coconut-shell activated carbon in particular has wide application in industrial and environmental processes, as it is a technically high performance product. The global production of all activated carbon is reported²⁹ to be 660,000 MT of which 120,000 MT is for water purification. Global coconut activated carbon production is reported to be around 130,000 MT, with exports of 120,000 MT.

Much less value creation than kernel & husk

A large portion of shell is consumed domestically, mostly burnt as fuel. Only around 15% of the world production of nut shells is processed for export. In 2006, an estimated 8 billion nut shells were processed for export. Of this, activated carbon accounted for 93% of total volume with the balance being shell charcoal.

Philippines is the largest exporter of shell products

Compared with other kernel and husk, value generated from shell is relatively low. When processed, within a local industry it is typically USD 10-30 per 1000 nuts, versus around USD 100 for husks and USD+ 300 level of kernel, as mentioned in previous section. The export value of activated carbon creates around USD 18 per 1000 nuts and shell charcoal and shell powder create USD 14 and USD 33, respectively.

Sri Lanka and Indonesia generates higher value from export due to shell powder & coconut shell

By country, Indonesia, Philippines and Sri Lanka are the major exporters of shell products in international markets. In 2006, Philippines' export was an estimated USD 45 million, equivalent to 2.7 billion nuts; whereas the amount of nuts for shell export is less than half of this for Indonesia and Sri Lanka, about 1 billion nuts. The strength of the Philippine industry is in part due to it having the largest volume of nuts entering the processing industry. This makes it economically viable to source large volumes of shells for export.

Export values created on product basis are similar across these countries. However, apart from activated carbon and charcoal, Sri Lanka also export shell powder - the light brown, free-flowing powder which is obtained by pulverizing shell of mature coconut. It has low resin absorptive properties and excellent pre-sealing qualities. It adds colour, strength and hardness to resins and glues which are used as binders for wood and wood products such as plywood and particle boards. It is extensively used as extender for phenolic molding powders. It is also used for making mosquito coils. Coconut shell powder generates USD 32 of value per 100 nuts, significantly higher than activated carbon or charcoal. Given the applications of shell powder, there may be good scope for future market growth. Besides coconut shell powder, export of

²⁹ Interview with Haycarb, Sri Lanka, February 2009

coconut shells also earns good income, at approximately USD 40 per 1000 nuts, but only Indonesia is exporting and demand may be limited.

2.6 Trends and Issues

2.6.1 Upheaval in the coconut oil industry

While coconut oil has been losing market share to palm oil in recent years, the strong growth in global vegetable oil consumption has made it possible for coconut oil to still sustain positive growth, albeit at around 2.5% per years. This is primarily from the industrial use market with food use all but stagnant, with growth of less than 1% per year.

Will stagnation turn to outright decline?

A major question for the entire coconut industry is whether the loss of market share to palm oil will accelerate in the coming years as more and more producers switch their production to palm.

If so, it is most likely that the current stagnation of coconut oil in the edible oil segment could turn in to an outright decline. This would most likely be triggered by a collapse in coconut oil use by consumers in producing countries, especially India and Sri Lanka.

Already, the domestic coconut oil industry is in crisis in both Sri Lanka and India, especially in Kerala. Sri Lanka has introduced protectionist policies to restrict imports of palm and try to support the domestic coconut oil industry – at the expense of the export industry and local consumers who are paying high prices for their cooking oil and fresh coconuts. Such measures appear to be unsustainable over the medium term. Kerala's coconut farmers are protesting at the collapse in coconut prices.

How will major producers respond to the current crisis?

The planned response of the Philippines oil industry to the competition is to attempt to dramatically increase the yield of coconuts at the farm level. In part this may be due to the greater export focus and importance of the growing industrial use segment. If successful this plan would greatly increase nut supply, lower nuts prices and allow the oil millers to produce more oil at lower cost. For the millers this would help address their over capacity problems, and raise their competitiveness. The net benefit to the farmers is unclear and will depend on the relative impact of higher yields versus falling nut prices.

Either a collapse in domestic coconut oil consumption in producing countries or a surge in yields in a major producer like the Philippines would result in a significant shift in the balance of supply and demand for nuts in the entire coconut industry, with far reaching consequence.

Nut prices would fall, but unevenly between countries.

Will the crisis trigger a major restructuring of the industry?

In countries with falling nut prices, exporters of other coconut products, especially other kernel products like DC and milk, could become more competitive internationally and gain market share but at the same time drive down prices. Countries with higher nut costs could face the possibility of either dramatically lower nut prices or the loss of large parts of their industry.

Coconut farmers worldwide would see lower income and there could be an accelerated reduction in coconut production in the worst affected areas.

Current crisis is set to last

But these changes would be slow and painful and the exact impact is hard to determine. What is clear is that the current crisis is set to continue.

2.6.2 Low productivity and farmer income

Farmers gain little from the coconut industry

The relatively low productivity at farm level, combined with low farm gate prices in several major producing countries, especially the Philippines and India, is a major long term weakness of the industry.

Can the industry make itself more attractive to farmers?

In the Philippines, coconut farmers are regarded as being among the poorest with few alternatives. In other producing countries, such as Malaysia and Thailand, the low income from coconuts has driven farmers to switch to other more profitable crops and an overall decline in the local coconut industry.

Unless the industry can find ways to increase farmer income, through higher nut prices and better yield, many more farmers may follow the example of those in Malaysia and Thailand and leave the industry.

2.6.3 Missed opportunities from using the entire nut

Many opportunities being missed

Globally, the coconut industry makes very poor use of anything other than coconut meat. Millions of tonnes of potentially valuable material, from husks, shells or water, are thrown away every year.

Local industries could double value created

At the same time, the value achieved per nut is low and coconut farmers struggle to make an acceptable living. This is especially true at the moment with the crisis in the coconut oil markets.

Efficient use of the entire nut in a local coconut industry could triple, or more, the value created compared to simple DC or oil supply chains. To illustrate this, using actual market data and prices we could consider a local industry that processes 100 million nuts per year and sells them as the products set-out in the table below.

Table 4: Possible output from a 100 million nut per year industry

2006 International average export prices	Product	000 nuts /MT	MT per year	USD /000 nuts (ave.)	Total value USD p.a. FOB
Kernel	Coconut milk (liquid & powder)	4.0	25,000	290	29,000,000
	Residue for animal feed	6.0	16,800	37	3,700,000
	Water - 33% of available water	4.2	7,920	50	5,016,000
Husk	Coir yarn	9.0	11,086	68	6,800,000
	Pith	3.9	25,873	62	6,200,000
Shell	Charcoal	19.7	5,076	13	1,312,000
Total				520	52,036,000

+USD 500 /1000 nuts achievable at industry scale

A sustainable competitive advantage

While market limitation mean that this is not possible for the entire global industry, those local industries that succeed in making the transition to an efficient industry will create a sustainable competitive advantage for themselves and deliver significant benefit to their business and farmers alike.

The dramatically higher value creation and efficiencies will also make them more resilient to wider industry upheavals.

2.6.4 Dealing with cocopith

Necessary for competitiveness

The most successful industries in the future will be those that have integrated kernel processing and good use of their husks and shells. This makes it essential to establish proper use or disposal of coco pith.

Best opportunities in Vietnam, India and Thailand

Proper use of cocopith within a local industry is therefore not only necessary to avoid major environmental pollution but is a necessary part of developing an internationally competitive coconut industry. Vietnam, India and Thailand have the greatest opportunities in the immediate future.

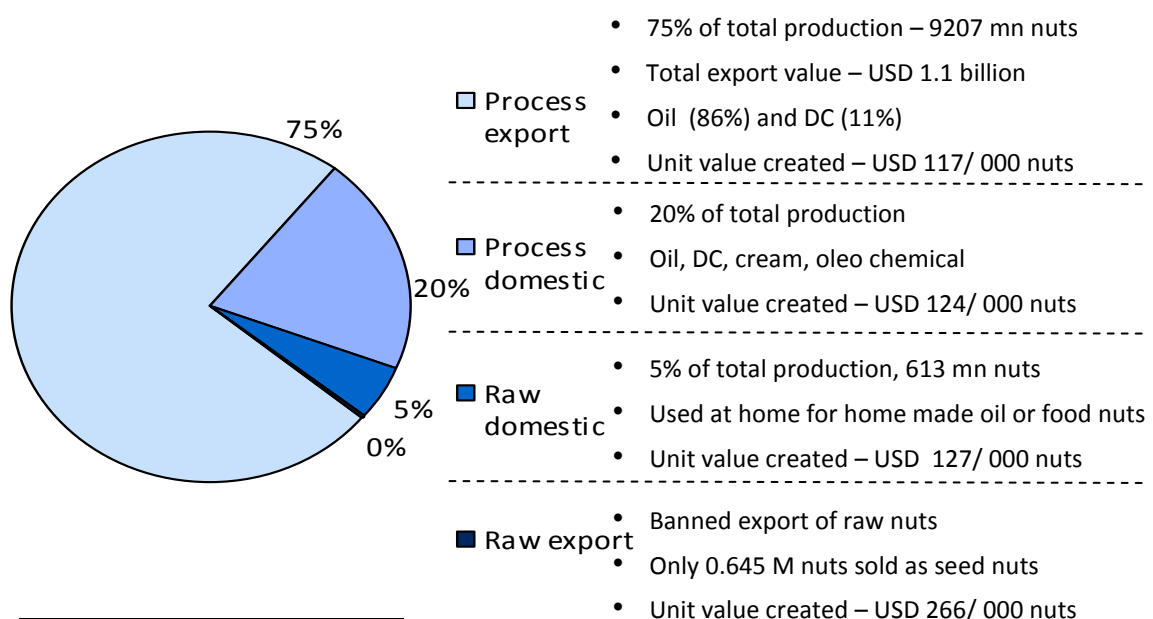
3 Profile of selected competitor countries

3.1 The Philippines³⁰

3.1.1 Highlights

- No. 1 exporter of coconut products (in volume and value) - USD 944 million in 2007, accounting for 59% share of world coconut exports
- No. 2 coconut producer in the world, after Indonesia, producing 21% (12 billion nuts) of world nut production from coconut plantation of 3.36 million hectare - production area and volumes broadly stable in recent years
- Export led industry with approximately 75% of nuts going in to exports
- 3.5 M coconut farmers, 25 M Philippines people are directly or indirectly dependent on coconut industry
- Mindanao island has 60% of production while 68/79 provinces are coconut areas,
- Low yield per hectare (~4000 nuts/ha)
- Low farm gate price (~ 10 USD cent/ nut) leads to low income of farmers
- Coconut industry dominated by low unit value commodity products (coconut oil, DC)
- Some successful integrated processing business selling high value products such as coconut cream, milk, milk powder and VCO – evolved from DC businesses
- Husk and pith are largely wasted or burnt
- Shell based products are used mainly for domestic use
- Coconut is a major industry for the country as a whole – representing 26% of major agricultural crops' value and 2% of total exports and 1% of GNP

Figure 15: The Philippines Coconut Industry 2007 - *at a glance*



³⁰ Data in this section, if not specified otherwise, is taken from: UCAP (2008) Philippines Coconut Statistics 2007 and Bawalan, D. (2009) Consultant report on Philippines Coconut Industry Benchmarking for PI

3.1.2 Production and utilization

No. 2 producer of coconuts

The Philippines is the second biggest coconut producing countries in the world, just behind Indonesia and ahead of India. The coconut industry is a major sector of Philippines agriculture, representing 26% of major crops' value. The coconut industry provides an annual average of 5.97% contribution to the nation Gross Value Added (GVA) and 1.14% to the Gross National Products (GNP). Coconut farms are widely distributed nationwide with 68 out of 79 provinces are coconut areas, however Mindanao island accounts for 60% of production.

No. 1 exporter of coconut products

While in other major coconut producing countries, a majority of coconuts in domestic markets, Philippines is the number one exporter of coconut products in terms of both volume and value with total export value of approximately US\$ 1 billion in 2007. The country accounts for 59% share in world coconut export which consumes about 75% of annual production, equal to 9,207 million nuts.

Only 25% to domestic market

Philippines use 25% of total nut production for domestic in which 5% is used at home as home made oil or food nuts, the other 20% is used for local industry to produce oil, DC, cream and oleo chemical for domestic consumption.

Raw nut exports banned

Philippines has banned the export of raw nuts, therefore, there are very few whole nuts exported, mostly in the form of seed nuts.

3.1.3 Export and product segments

96% of export is kernel based products

Total export earning of Philippines coconut industry is more than USD 1 billion annually, in which kernel based products contribute 96%. Shell based products account for only 4%. Husk and water are largely wasted or burnt

Kernel products

Oil and DC dominant but low unit value

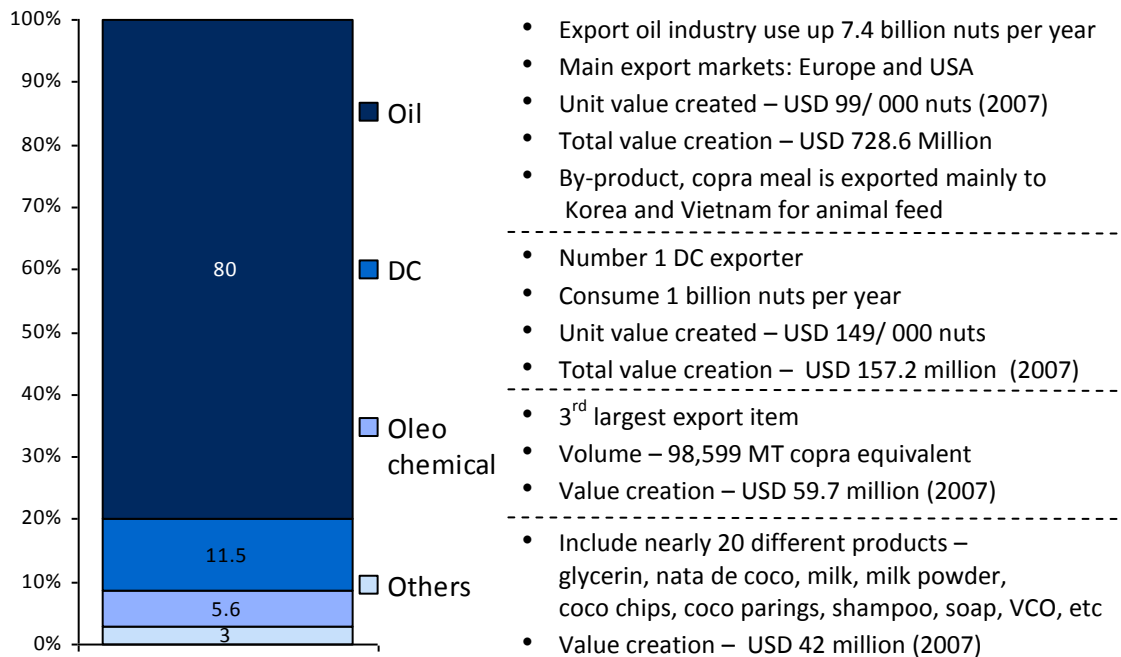
Philippines have the widest range of products but they still focus heavily on traditional, low value commodity market of oil and DC. Oil³¹ and DC account for 86% and 11% respectively of total kernel based export volume, leaving only 3% for a list of 20 different products. If not producing oil and DC, Philippines would hardly find a market that can consume their huge supply of coconuts.

Oil industry relies on large

The export oil industry uses up 7.4 billion nuts per year. Main markets of Philippines oil are Europe and USA. Each market consumes roughly 42% of total oil volume. Oil exported Europe (mainly France and Germany) is mainly for food application while oil exported to US is more for refining and high value personal care products. The value created by oil business is quite low at USD99 per 1000 nuts. The profit margin for oil production is about 5%. The oil industry can make profit due to their large economy of scale and power in the industry, despite such low margin. However this puts downward pressure on the price of raw coconuts.

³¹ Including copra

Figure 16: Philippine Kernel Exports



The Philippines industry is facing two major competitive pressures:

Strong
competition from
palm oil

Substitution of coconut oil by palm oils: Philippines oil industry has confronted the strong competition from palm oil in both edible and non edible oil markets. Palm kernel oil has similar chemical property as coconut oil for oleo chemical uses. Moreover, palm oil is cheaper to produce and have higher yields and is out competing coconut oil in the edible oil market. An interview with the Horticultural Research Institute in Bangkok shows that the annual return to a hectare for palm oil is USD 3,788 while the income of coconut oil is USD 2,659 per hectare if the coconuts are grown under ideal conditions and fertilizer is applied – which is rarely the case.³²

Major oil millers now privately concede³³ that coconut oil has largely lost the battle in the edible oil export markets to palm oil. However, they see growing possibilities in the industrial and oleo-chemical markets, led by US markets.

Head on
competition from
other major
producers

Competition from other major coconut producers³⁴: Philippines also meet a head-on competition from Indonesia, the number 2 coconut oil exporter and major DC exporter as Indonesia has better freight cost and offer discount up to \$20-40/MT on oil to win market share from Philippines. In addition, interviews with several oil millers in Philippines give the fact that most of oil millers typically run at approximately 50% capacity.

³² Thailand Horticultural Research Institute – The Department of Agriculture, expert interview 2008.

³³ Private interview with senior executives of a major oil miller, April 2009.

³⁴ Interviews with various Philippines coconut companies, April 2009

In the presence of fierce competition, each group of producers in Philippines has their own response:

Giant oil millers responding by increasing productivity at farm level	<p>Giant oil millers, such as CIIF, hope to improve competitiveness versus palm oil (and also raise the utilization of their mills) by seeking to increase productivity at farm level (by increased yield). They are also looking to focus on the growing industrial use markets. In terms of productivity, they hope to triple the copra yield at the individual farm level in the next 2-3 years. If this is achieved over 50% of the production area this would result in a 100% increase in the Philippines' raw material supply – equivalent to more than a 50% increase in the world supply of nuts for export. So, if the Philippines is successful in increase their productivity, it would trigger a major change in the global coconut industry. It would affect the price of nuts and other coconut product in the market due to their huge scale increase. A triple productivity would enable the Philippines to be very competitive in every coconut market but may trigger a price collapse. In the world market.</p>
Looking to industrial use markets, especially US	<p>Smaller scale oil millers are looking to niche high value markets like organic, VCO and biodiesel (eg. SC Global) However, it is observed those successful VCO producers are the ones who produce it in parallel to other products (eg: SC Global, Peter Paul Philippines), not the ones who produce only VCO because of the uncertain but lucrative nature of the VCO market. This is equally true for other niche oil-based products. The major market for VCO is the domestic market and export markets are very recent an currently unproven.</p>
Successful integrated business grew from former DC processors	<p>Beyond the mainstream oil industry, it is notable that a few of the currently most successful coconut business are former DC processors who have switched to integrated processing and became successful with the new business model. Peter Paul Philippines, having the biggest DC processing facility in the world, now moves into integrated processing, producing not only DC but also other high value products such as milk, powder, VCO. Other examples are Fiesta Brands, Atson Coco Inc. and Tropicana Food Products Inc. Each of these gradually added new products to their range over several years, typically starting their shift to integrated processing in the 1990's and are continuing to add new products to maximize value to this day. For many, some of the latest additions have been VCO and spray dried coconut milk powder.</p>
Spray dried milk powder and VCO latest products	<p>Husk products</p>
Only 5% of husks processed, rest burnt or waste	<p>While kernel part is used up for manufacturing different end products, coconut husks are mostly used for fuel for drying copra (65%) or go to waste (30%). Only a small proportion of husks available (5%) is processed into coir products.</p>

Mostly bailed
fibre

Husk products in Philippines are mostly limited to basic intermediate material rather than value added products. Husk exported products are mainly bailed fibre, sold to China. However, in recent year the Philippines has suffered from strong competition from Vietnam for China market..

Pith use still
negligible

The pith business is very minor in Philippines. Coco pith is hardly moving since there is nearly no export of coco pith at the moment and small domestic demand. There are some efforts to turn pith into bio fertilizer but in very small scale.

In the last 5 years, there are also some successful businesses making effort to create value from husk, such as the award winning Cocogreen, but overall the husk and pith industry is still very underdeveloped and unsophisticated and a missed opportunity for the industry.

Shell products

76% of shells for
charcoal for
domestic market

A majority of coconut shells generated in Philippines are converted into charcoals for the domestic market (76% of shells available).

Activated carbon
exported to EU,
USA and Japan.

Shell based product exported is equal to 24% of total shell available. The primary product is activated carbon sold to Europe, Japan and USA. Philippines is also the biggest exporter of coconut shell charcoal with Japan as the biggest buyer. The value created from shell export product is \$14/ 000 nuts.

3.1.4 Institutional structure

Strong
institutional
structures

The coconut industry is a major sector of Philippine agriculture and also one of major sources of export revenues for the country. Therefore, Philippines has a well established structure of business associations, governmental organizations and research networks to support the coconut sector with the objective of developing a globally competitive coconut industry.

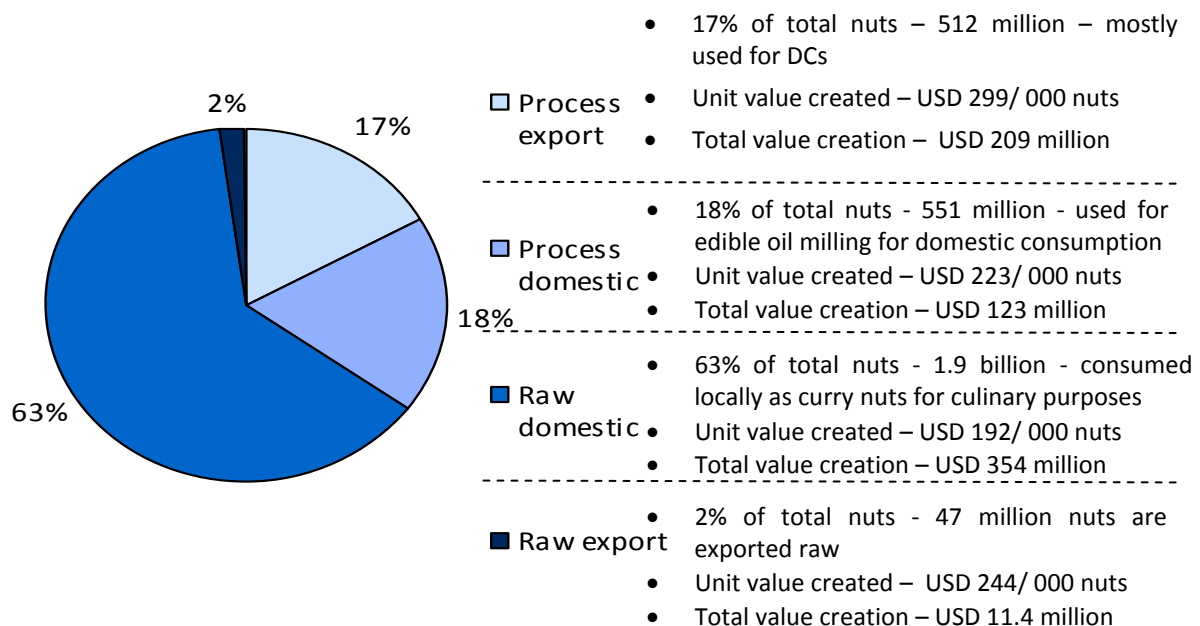
The main organizations are Philippines Coconut Authority (PCA) – the lead government body - and United Coconut Association of the Philippines, Inc (UCAP) – the lead business association. UCAP is funded through a levy on coconut oil exports. There are numerous research stations and centres for the industry.

3.2 Sri Lanka³⁵

3.2.1 Highlights

- 5th largest producer of coconuts in the world (plantation area: 395,000 ha, production: 2,784 million nuts, 2007) – production area has been slightly decreased for the last 5 years (5% drop from 2002- 2006)
- Highest per capita consumption of coconut in the world, mainly as curry nuts –a major national food source
- 80% of annual production are used domestically, as fresh curry nuts and oil
- Husk exports are equally important as kernel exports – uniquely so in the world
- Husk and shell industries have well developed product mix and high end applications
- DC dominates exports of kernel products, but DC processors are facing shortage of affordable supply due to the competition with domestic coconut oil producers
- A small number of successful integrated kernel processing businesses
- Price per nut = 16 USD cents/ nut (2007)
- High productivity - 7000 nuts/ha or 1.3 MT copra equivalent per ha.
- Major tension in the industry between domestic curry nut consumers, domestic oil producers and exporters

Figure 17: The Sri Lanka Coconut Industry 2007 - at a glance



³⁵ Data in this section, if not specified otherwise, is taken from: CDA (2008) Sri Lanka Coconut Statistics Yearbook 2007; Cader Z. (2009) Consultant report on Sri Lanka Coconut Industry Benchmarking for PI

3.2.2 Production and utilization

5th largest
coconut
producer

Major staple
food for country

Good yield but
declining area

Sri Lanka is the fifth largest producer of coconut in the world after Indonesia, India, Philippines and Brazil. In 2006, Sri Lanka's production is 2,784 million nuts. Sri Lanka is the largest per capita consumer of coconut in the world. Coconut is a key ingredient in the Sri Lankan diet and is major source of fat and protein. Around 80% of annual production is used for domestic consumption (as 63% as curry nuts and 18% as edible oil) with only the balance being available for kernel based export industry such as desiccated coconut, coconut oil, coconut cream and milk powder.

Sri Lanka has relatively high yields at around 7000 nuts per hectare but a declining overall production area which fell by 11% between 2002-2006 and now stands at 395,000 hectares – mostly in the “coconut triangle”.

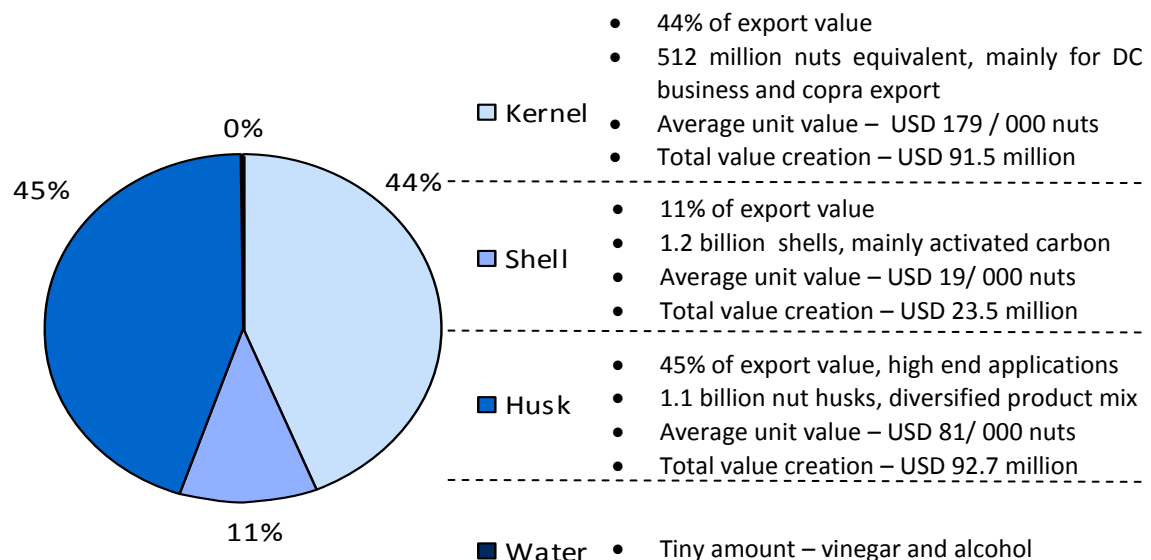
3.2.3 Export and product segments

Husk export
match kernel
exports –
unique in world

Total export value of Sri Lanka in 2007 is around USD 220 million in which kernel based products and husk products share the largest part of approximately 45% each in value term. Shell based products accounts for only 11%. Water based products are very tiny.

Sri Lanka is the only major coconut industry worldwide where husk exports match the importance of kernel products – and is an example for others to copy in this regard.

Figure 18: Sri Lanka's unique export industry - At a glance



Kernel products:

DC main kernel
export

DC is the dominant product in the kernel export kernel portfolio of Sri Lanka. Sri Lanka is the 3rd largest DC exporter, after Philippines and Indonesia with India as the biggest consumers. Sri Lanka is losing market

share to Vietnam in Middle Eastern markets.

DC business faces difficulty in raw material supply in recent years as DC business (and other export coconut industries) cannot compete with domestic coconut oil industry.

Governmental policy to protect domestic oil industry causes difficulty for export producers and consumers

The domestic coconut oil industry is the main competitor for raw materials with the export industries. The domestic edible oil consumption in Sri Lanka is around 160,000 – 170,000 MT per year and more than 50% of this demand is currently met by imported edible oils (particularly edible grade of palm oil and palm kernel oil) and the rest from coconut oil. The prices of imported edible oils therefore determine the price of locally manufactured coconut oil prices with a strong influence on the price of nuts. Sri Lanka government recently imposed a very high import duties and charges on imported edible oil that adds up approximately 115% to the CIF value. The import duty was imposed to protect the local coconut oil industry. Consequently, the price of the oil produced locally also surge up to over twice the international price and nut prices rose accordingly – including for the 60% sold as curry nuts for home consumption. The government has shown uncertainty in how to balance the interests of the competing parts of the industry – and so import duties have been dramatically increased only to be reduced again with surprising frequency in the last 4 years.

Export industries, such as DC, cannot compete with the domestic coconut oil industry for raw materials while very high import duties are in place on edible oils. The government policies, while trying to protect the domestic oil industry, have caused drastic decline in export production and a high price of nuts for domestic consumers. Export business now claim that between 10,000-15,000 jobs are now at risk due to the current policies.

Successful integrated business model focusing on high value products

Although the export industry is dominated by traditional products, such as DC and copra, Sri Lanka also has higher value added export products such as coconut cream, coconut milk, coconut powder and VCO which consume about 56 million nuts in total (account for 11% of total nuts used for kernel export products). An interview with Renuka Group Limited, the largest Sri Lankan company specialized in food and canned coconut products, shows that the milk and cream business is very much integrated in the food and beverage business, not just “coconut business”. It is also commented by Sri Lankan coconut processors that VCO is high value product but it has limited market demand. The consumption markets are Europe or US with strict quality certification.

Husk products

World leading husk industry

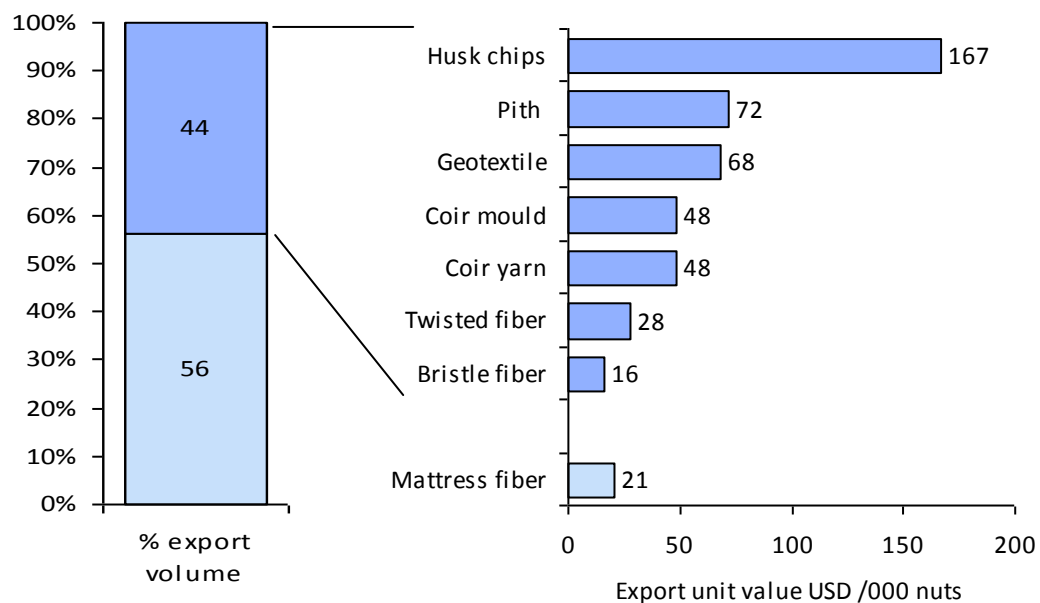
Sri Lanka has a well developed husk processing industry with diversified product mix and high unit value. Sri Lanka has a Coir Research Development and Training Center dedicate to support the coir industry. Sri Lanka and India are the two single countries that currently add significant value to husk products successfully.

High value and diversified product mix

In 2007, the husk industry utilized slightly more than 1 billion husks for export (almost twice the number of nuts used for export) and generated

about USD 93 million. Although more than half of husk products are exported as bales of mattress fibre, Sri Lanka has successfully turned the

Figure 19: Sri Lanka Husk Industry - product mix and value, 2007



rest into a wide range of high value finished products such as husk chips, geo textile, coir mould, coir yarn, twisted fibre, and pith products. The average unit value created from husk based products is USD 81 per thousand nuts.

China is a large market for baled fibre, while US, Europe and Japan are large markets for other fibre based products.

Successful Coir business – Harleys Export, Tropicair

One example of a successful coir business is Hayleys Exports. The company is the largest designer, manufacturer and exporter of coir fibre products in Sri Lanka. Hayleys Exports is ISO 9000 system certified and has been a pioneer manufacturer and exporter of coconut coir erosion control products in the world. Hayleys Exports has sales offices in the US, Japan, and UK.

Joint Ventures with companies in target markets are important

Tropicair, established in 1997, is another major exporter of coir from Sri Lanka, with a strong focus on quality production processes. As part of its expansion plans, Tropicair has secured an investment of Pacific Wide group, a major player in New Zealand's horticultural industry. The investment by Pacific Wide is believed to create substantial synergy for both parties.

As illustrated by the Tropicair, many successful husk companies have joint ventures with partners in major markets to better access end markets (e.g. Europe, USA). Those companies often have tight relationship with end markets like horticulture and agriculture industries, erosion control industry, etc.

Future growth limited by economic supply of husks

Husks used for coir industry are mainly collected from major curry nut wholesalers or big kernel processors. Over twice as many husks are

High value shell
based product –
mostly
activated
carbon

processed to value added products for export than nuts for kernel products marking the competitiveness of the husk industry in Sri Lanka. However, it is believed to be close to the limit on economic supply of husks thus unlikely to grow much more. This is further evidenced by the plans of several leading husk businesses³⁶ to expand their production operations overseas.

Shell products

Activated carbon production is the major coconut shell industry in Sri Lanka, accounting for 95% of shell product exports. The country is the 5th largest exporter of activated carbon. In 2007, Sri Lanka exported 22,453 MT of shell based products with a value of USD 22.3 million. Charcoal product is only 5% of total volume. The production of charcoal is diminishing in Sri Lanka. Some of the larger activated carbon companies³⁷ are importing shell charcoal and looking for expansion of production facilities overseas as the economic supply of coconut shell is reaching its limit.

Well developed
institutional
structures

3.2.4 Institutional structure

Inconsistent
policies,
especially on oil
imports

Coconut is an important crop in Sri Lanka. The coconut industry is supported by a well developed institutional structure. Sri Lanka has a number of different organization which enables the industry to develop and commercially viable such as Coconut Development Authority (CDA), Coconut Research Institute (CRI), Coir Research Development and Training Center (CRDTC), the Industrial Technology Institute (ITI). Besides the government agencies, private actors comprise most of specific coconut trade associations like Desiccated Millers Association, Coconut Growers' Association, and Coconut Oil Millers Association.

Coconuts
important for
national food
security

Coconut plays a central role in Sri Lanka's food security, thus, the institutional structures and policies appear to place the greatest priority on developing the coconut sector for the domestic market rather than as an export led industry.

³⁶ Private interviews with managers of several husk product businesses in Sri Lanka, February 2009.

³⁷ Private interviews with managers of activated carbon businesses in Sri Lanka, February 2009.

3.3 Thailand³⁸

3.3.1 Highlights

- 6th largest coconut producer in the world (plantation area: 226,000 ha, production: 1,284 million nuts, 2006).
- High yield per hectare in copra and nut terms, but plantation area has declined by >30% since 2002, in part due to a growing shift to oil palm cultivation.
- 75% of Thailand's annual coconut production is consumed domestically in the form of processing food, beverage and drinking nuts.
- Kernel based industry in Thailand is well developed and integrated into food processing industries. Thailand is possibly the largest producer of coconut milk, accounting for perhaps 20%-40% of global production.
- Husk industry processes around 20% of husk for export but at very low value
- Number 5 exporter of shell charcoal and activated carbon (30,588 MT)

Note: There is less complete and reliable data available on the Thailand industry.

3.3.2 Production and utilization

>30% drop in plantation area and yield since 2002	Thailand has a production of 1,284 million nuts. Coconut is grown on approximately 226,000 ha located mainly in the southern and central plain part of Thailand. Since 2002, production area in Thailand has declined by >30% mainly due to a growing shift to palm cultivation which gives better yield and higher farm gate price.
>60% consumed domestically	<p>Approximately 60% of coconuts produced are sold in the market for consumption. There is no record data on how these nuts are utilized. Around 25% of total nuts are sold to factories for processing. There is limited information to identify the volumes of final products and utilization of these products – although most are understood to be processed by integrated food processors as an ingredient into a wide array of food products as well as some specific coconut products.</p> <p>The remaining 15% are processed in coconut milk processing plant. There is no data on how much coconut milk is for export and for local consumption. A crude estimate may be that Thailand represents 20%-40% of global coconut milk production.</p>
High domestic consumption but in the form of processed food, milk and drinks	The domestic consumption of Thailand is high as much as Sri Lanka at the rate of >60% of total production. The difference between these countries is that the domestic market in Thailand is very well developed with many processed product (cream, milk, powder, drinks) with recognized brands, while in Sri Lanka, it is simply just curry nut selling in local market without brand name.

³⁸ Data in this section is taken from the report of Thai Consultant which is mainly sourced from Office of Agriculture Economics, Ministry of Agriculture and Cooperatives, Royal Thai Government

3.3.3 Export and product segments

While data is incomplete, it can be concluded that the export incomes mainly comes from kernel based products and some fresh nut exports for drinking. Export of husk is reasonable volumes but very low value. Shell based product is mainly activated carbon.

Kernel products

High value nut export for fresh drinking

It is reported in APCC 2006 that Thailand exported 27.6 million raw nuts at the value of US\$ 363 per thousand nuts. Such high unit value export suggested that Thailand exported tender nuts to foreign market for drinking.

40% of total nut production is sold to factories or coconut milk processing plant. It is unable to identify the portion of domestic use and export of finished products.

Coconuts are absorbed into a sophisticated food and beverage industry

A notable point in the Thailand coconut industry is that the processors in Thailand are typically integrated food processing and marketing businesses³⁹ with product lines that go well beyond coconut based products under various brand names. These companies do not operate in a coconut industry but in a well developed and sophisticated food industry and set an interesting example for competing countries. Several Thai businesses are now looking to expand production in to neighbouring countries targeting exports markets in developed countries.

Husk products

20% of husks processed for export but at low value

According to APCC 2006, Thailand exported 34,239 MT of coir and coir products which is approximately equivalent to 270 million nuts (21% of total nut production). However, they achieved low value of around USD 17/000 nuts. Interviews with a number of Thailand kernel processors indicated that much of husk and fibre is dumped, which is consistent with the 80% unused husks.

High utilization of available shell

These volumes of husk fibre processing indicate that over 80,000 MT of coco pith would be generated each year. However, reported exports are just 2,500 tonnes. While some may be used domestically, a large quantity is likely to be being dumped or burned each year.

Shell products

No association specifically for coconut sector

APCC 2006 showed that Thailand exported 30,588 MT coconut shell charcoal and activated carbon (equivalent to more than 1 billion nuts), ranking number 5. Value creation is around 8 million USD

3.3.4 Institutional structure

The Research Institute, a part of the Ministry of Agriculture and Cooperatives located in Bangkok, and the Chumpan Research Center are the only research centres dealing with coconut. No business associations are reported to be functioning.

³⁹ This may, in part, explain the more limited data available on the industry.

4 Current industry situation in the Mekong Delta

4.1 Mekong Delta Industry

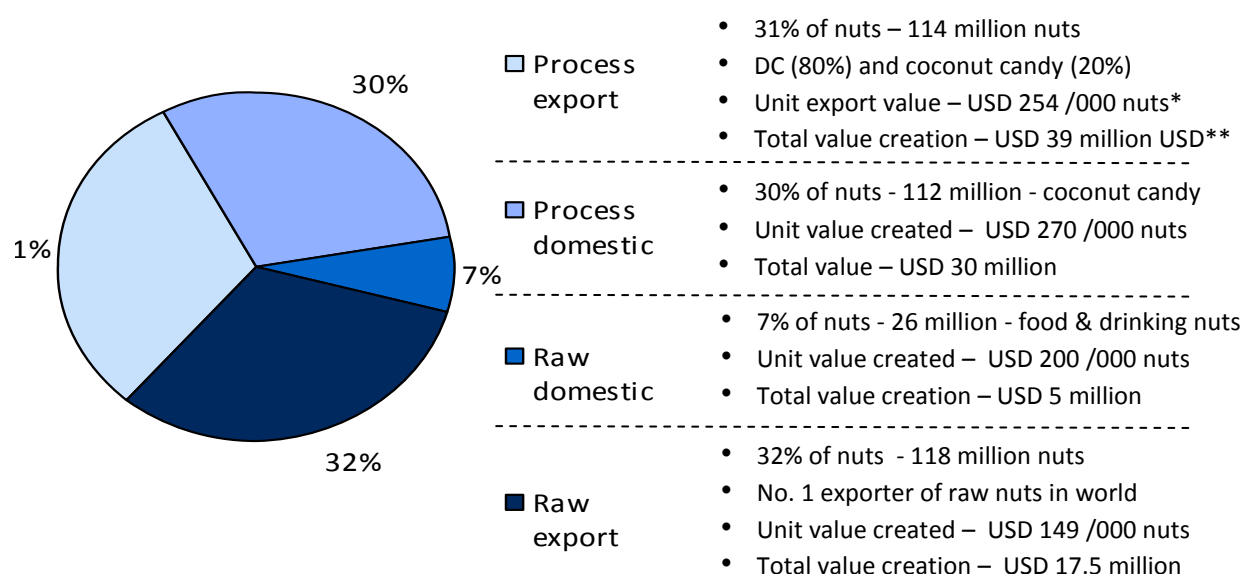
Mekong Delta >75% of Vietnam production	The Mekong Delta is the centre for the coconut industry in Vietnam, and Ben Tre is the hub for the industry in the Mekong Delta. The total production area in the Mekong Delta is approximately 110,000 ha, more than 75% of the total coconut area in Viet Nam of 130,000 ha. Ben Tre has the greatest concentration of coconut businesses and >40,000 ha of production land, almost 40% of the area on the Mekong Delta.
Ben Tre key to Mekong Delta	The industry cluster in Ben Tre is therefore central to the competitiveness and future potential for the wider industry in the Mekong Delta. The following section, therefore, focuses on the Ben Tre industry.

4.2 Ben Tre Industry¹

4.2.1 Highlights

- Largest coconut area in Vietnam (plantation area: >40,000 ha, production 310 million nuts)
- World's biggest exporter of raw nuts - around 100 million per year, mostly to China
- Kernel based industry is mainly coconut candy for the domestic markets and low quality DC for export
- DC industry grew from the first DC joint venture with Sri Lanka in 2001
- Local coconut industry is vulnerable to price fluctuation, triggered by export demand for raw nuts
- Achieve quite high return per 1000 nuts thanks to unique traditional product of coconut candy – but limited growth potential
- Good utilization of husk and shell but for basic value products: baled fibre, charcoal
- High yields of 7,700 nuts per hectare and average nut weight of 1500 grams
- Recently attracted foreign investment into activated carbon and integrated kernel processing businesses
- Only 20% of pith used, and the rest is a major local environmental pollutant

¹ Data in this section is taken from Ben Tre IPC, 2007

Figure 20: Ben Tre Coconut Industry 2007² - at a glance

4.2.2 Production and utilization

Largest coconut area in Vietnam	Coconut trees cover around >40,000 hectare in Ben Tre with the plantation density of 160 – 200 trees per hectare. The total production of the province is around 310 million nuts per year. The province has to purchase additional 60-70 million nuts each year from neighbouring areas to feed the local industry. Ben Tre accounts for 44% and 35% of national production and coconut plantation area ,respectively.
44% production 35% area	
310 million nuts	Coconut production is almost exclusively on small holder farmers, with a typical area of 0.2-0.5 ha per household.
High yields	By international standards, yields are high at 7,700 nuts per hectares with average nut weight of 1500 grams and a low proportion of senile trees. However, there is evidence ³ of the potential for raising yields further through improved cultivation practices and varieties. The local authorities have a programme to raise yields to 9,000 per hectare in the coming years, a 16% increase. This could be expected to increase farmer net incomes but also put downward pressure on nut prices, which would increase the overall competitiveness and growth potential of the local industry.
Smallholder based 0.2-0.5 ha. / household	
High cost nuts	Ben Tre has relatively high nut prices, averaging around 2,500 VND / nut in 2008 but reaching 5,000 VND/nut at times. The average price is comparable to Sri Lanka but 2-3 times higher than in The Philippines or Indonesia. The average return per hectare is around VND 19 million
Return to farmers USD1,100 per ha.	

² Notes:

Source: Ben Tre IPC

* USD 184 from kernel, USD 16 from shell, USD 41 from husk and USD 13 from water based (jelly)

** USD21 million comes from full utilization of 114 million nuts, USD 18 million from use of extra husks & shells

³ See the work of the Coconut Research Centre of the Oil Palm Research Institute in Ben Tre and Ben Tre Department of Agriculture and rural Development.

Intercropping returns: USD3,700	per year (USD1,100), although it is not unusual to find annual returns equivalent VND 29 million (USD1,650). When intercropped with cacao the combined return per hectares is above VND 65 million (USD3,700)
Usage - 30% to each of: - raw exports - coconut candy (domestic mkt) - processed exports	Coconuts usage in Ben Tre is split equally among raw nuts export, processed product export (75% DC and 25% candy) and processed products for domestic consumption (100% coconut candy, a unique product of Ben Tre). Each accounts for approximately 30% of total production. Only a small amount of nuts (7%) are consumed domestically as raw nuts for either food or drinking purposes.
Biggest exporter of raw nut in the world	A significant feature of Ben Tre in comparison to other coconut producing countries is the highest proportion (32%) and volume (118 million nuts) of nuts being exported as raw nuts. Vietnam does not impose tariff or restrictions on coconut export products, even the raw nuts. Thus local processors have to compete in the open market with foreign traders for nut supply. At present, raw nuts are sold mainly to Chinese buyers. In the last two years these buyers have been able to pay significantly higher prices than many local DC processing businesses. This is believed to be because the nuts are more efficiently used for higher value products when processed in China. Such buyers have been active for around 3 months each year, although with limited activity in first half of 2009.
Raw nut exports driving price volatility	This is an important issue for the industry, creating both opportunities and risks. It delivers significantly higher prices to farmers for short periods during the year. However, on the negative side, it creates considerable volatility on both prices and supply volumes for these periods for local processors. These are hard to manage as raw nuts must be processed soon after harvesting and cannot be stockpiled for long periods to smooth supply.
Supply uncertainty is threat to DC industry	With businesses unable to secure affordable nuts, several DC businesses have largely suspended production during the periods of major export buying of raw nuts for the last two years. This significantly undermines the commercial viability of these businesses both in terms of profitability and meeting customer orders. At the same time, the absence of the raw nut export buyers during the first half of 2009 points to the uncertainty about this as a market, which is in any case limited to around 3 months each year. This is therefore a major risk to the local industry if DC processors become commercially unviable. Thankfully there are proven opportunities for DC processors to invest in more integrated kernel processing, raising the value they create from their nuts and making them more competitive both in export markets and in securing raw nut supplies against export buyers.
Export revenue Kernel 55% Husk 38%	4.2.3 Exports and product segments Total export revenue from processed coconut products (apart from raw nuts export) was USD 59 million in 2007. Kernel based products

has the biggest contribution to the export revenues at 55%. Husk based products contribute 38% share. and shell-based products 7%.

Kernel products

Coconut candy is one of main kernel based products, mainly for home market

Although the coconuts have been grown in Ben Tre for a long time, the local coconut industry is very new to the global market and technology.

Candy is high value

The largest single use of nuts is for the manufacture of Coconut Candy⁴, a traditional and unique product of Ben Tre province. The candy industry uses 140 million nuts per year. 80% of coconut candy produced is consumed domestically with 20% for export market, mainly sold to the Vietnamese overseas community. Coconut candy is a high value product with the final product achieving over USD 1000 per 1000 nuts. However coconuts represent only around one third of the cost of production, so a fairer value for comparison purpose is around USD300-330 /per 1000 nuts. Coconut candy also creates significant employment.

Candy mainstream export potential untested

At present coconut candy is limited to mainly Vietnamese markets, and product packaging and finishing is relatively rudimentary. Little efforts have yet been made to test the potential for exporting the product into mainstream export markets, with the necessary improvements in packing, finishing and hygiene standard. However,

the nature of the product and growing popularity of coconuts in some countries, such as China, suggests that there may be value in testing the export potential in Asian as well as Western and Middle Eastern markets.

Recent DC industry

Currently, the major exported kernel products in Ben Tre is DC with total income creation is USD 14.1 million in 2007, with a unit value of USD164 per 1000 nuts. The DC business has grown since 2001 when the first joint venture with Sri Lanka (Silver mill) was established. The main markets are Eastern Europe and Middle East where the price rather than quality is the main factor in purchase decision. The DC from Ben Tre is mainly exported in un-branded pack products. The quantity of DC exported from Ben Tre is insignificant in comparison to giant exporters like Philippines and Sri Lanka. Recently, DC business in Ben Tre suffered from significant raw material price fluctuation, as outlined above. For example in 2008, when the Chinese boats came to purchase nuts, nut price rose above 2,500 VND⁵ and up to 5,000 VND per nut, the local DC business could not afford to pay for the raw material inputs and some business closed down operation or reduced production to a minimum to fulfil outstanding orders.

DC businesses vulnerable to nut price volatility

Ben Tre province has around 250 coconut processing businesses, mostly engaged in candy, DC and husk fibre production. The larger DC processing factories are centralized in Ben Tre town while coconut candy business are more numerous and smaller scale. Mo Cay and

⁴ Coconut candy is similar in appearance and consistency to toffee but with a sweet coconut flavour

⁵ Exchange rate USD 1 = VND 17,500

Chau Thanh districts are coconut candy production centres with over 100 workshops of various scales.

New investment in integrated kernel processing Wonderfarm is the most well know integrated coconut processing company in Vietnam, based in the nearby province of Dong Nai. While there are not yet any integrated kernel processing businesses operating in Ben Tre, a Thai business has just received approval to open a USD 12 million modern integrated processing factory, making coconut milk, drinks and other products for export to US, EU and elsewhere.

Husk products

High utilization rate of husks Ben Tre has the highest rate of utilization of available husk of any reported coconut producing country, with an estimated 96% of available husks processed for making fibre and fibre net for export.

The fibre business in Ben Tre began in the 1990s and flourished between 1993 – 1997. There are approximately 325 fibre small and medium sized processors, locating mainly along Thom River⁶ banks, providing jobs for around 10,000 local labourers.

But low value products However, the fibre product is limited to intermediary raw material (baled fibre) rather than value added products. The province sold 53,846 MT of baled fibre in 2007 (equivalent to 331 million nuts) mainly to China, bring total earnings of USD 13.5 million. A small number of husks, equivalent to 28 million nuts are processed into fibre net and other higher value finished products.

Could readily expand output of finished fibre products creating thousands of jobs There is significant potential for the industry to readily expand production of finished and higher value husk fibre products as the husk fibre is already available in the industry and some local businesses are already exporting to key markets and have unmet customer orders. This is an important opportunity to raise the competitiveness of the overall industry by creating significant additional value from the whole nut, as proven by Sri Lanka. Furthermore, production of finished fibre product is likely to be the largest sources of additional employment creation from within the industry, with the potential for several thousand new jobs.

Limited usage of pith As a result of fibre business, there are huge amounts of coco dust or pith produced. The volume of fibre export would generate more than 110,000 MT of pith each year, but only around 20% is estimated to be used. There is therefore potentially more than 80,000 MT of coco pith being dumped into the Mekong River each year. This is causing major pollution to the river and the living environment and is highly unsustainable. Without addressing this, the husk fibre sub-sector is unsustainable and this, in turn, undermines the competitiveness and viability of the entire industry. Recently, the provincial government has encouraged local and foreign companies to use coco pith to produce bio-soil, organic fertilizer, etc. One Korean company and a few local companies have begun small scale processing but none on significant scale.

A major environmental pollutant Essential to tackle this for the entire industry

⁶ A branch of the Mekong River

Shell products

Basic shell export product - charcoal	The only significant shell product exported by Ben Tre is charcoal. The province exported 11,006 MT in 2007 at the price of USD 16 per 1000 nut equivalent with a total value of USD 2.5 million. The volume of charcoal exported is equivalent to 42% of total shells available. There is no recorded data on the usage of the rest of the shells quantity in Ben Tre. It is observed that the coconut shells are used as fuel in some candy processors and small DC producers and for handicraft products.
New investment in activated carbon	Vietnam, and Ben Tre in particular, hasn't exported coconut shell activated carbon yet. However, a recently established French-owned company in Ben Tre hopes to increase exports in the near future.

4.2.4 Institutional structure

Limited existing institutional framework	<p>The development of the coconut industry is now a major priority for the provincial authorities. However, until very recently the only notable institution directly supporting the industry was the long established Coconut Research Centre of the Oil Palm Research Institute's facility in Ben Tre.</p> <p>There has been no organization or framework to support the coconut sector in terms of formulating the long term strategy for the sector, supporting and providing industry research, information and technology, and more importantly, promoting the coordination among the various actors for the common benefit. There has also been no industry association to enable local businesses to participate in governmental discussion in terms of policy, tax, or trade matters relating to coconut industry.</p> <p>There are also no groups or association at the level of coconut growers such as farmers association, processors association or traders association.</p>
Improvements in last 2 years	<p>However, over the last two year the province has taken significant step to improve the sector enabling environment. It has dramatically improved its competitiveness as a site for inward investment, raising its Provincial Competitiveness Index Ranking⁷ from 26th to 7th from 2006 to now.</p>
Further development ongoing	<p>In 2009, a new industry association is being set up with the backing of the local authorities and business, being launched in August 2009. It will be important that this becomes a strong and effective body, as with UCAP in The Philippines.</p> <p>The provincial authorities have also launched a multi-stakeholder industry strategy development process including a series of consultation events and research.</p>

⁷ Vietnam Provincial Competitiveness Index - <http://www.pcivietnam.org/index.php?lang=en>

5 Examples of best practice at a company level

5.1 The SAMBU Group, Indonesia

An industry-scale integrated kernel processing business

Sambu Group is an Indonesia-based corporation. It is viewed today as the single largest integrated coconut industry in the world. It is a fully vertically integrated business, and operates the whole chain of the coconut industry, from plantation of nuts to distribution of differentiated coconut products to the world market.

100,000 hectare plantation

Sambu manages 100,000 hectares of mixed coconut plantation and pineapple crop. The Group also owns three manufacturing state-of-art sites operating modern technologies, with strong quality controls to meet export standards. These sites are strategically located nearby Singapore port to facilitate transportation of products and reduce inventory cost.

High value products along side traditional lower value ones

Sambu's portfolio consists of various coconut products, from high value products including coconut milk / cream, coconut milk powder, drinks, organic products, VCO and VCO-based personal care products to its lower value traditional products of DC, coconut oil and copra. Sambu's markets now span almost all key markets in the world. Its products have strong presence in Europe, America, Australia, China, and Asia as well as its home market.

20,000 workers

Today, Sambu Group employs nearly 20,000 staff, of which 16,000 employees work at the three manufacturing and plantation sites.

Began as oil miller
Diversified gradually over 25 years

Sambu started as a coconut oil miller in 1967. Cooking oil, crude coconut oil, and copra meal were the key products. In 1983, a second processing plant was established to make desiccated coconuts and coconut cream. The subsequent vertical integration into plantation enables Sambu to control material inputs and boost its product quality for export.

No husk or shell products marketed

It is interesting to note that husk or shell products are not mentioned in Sambu's portfolio in spite of the volume of husks and shells from the 100,000 hectare coconut plantation that has to be dealt with.

Over the last decades, Sambu has been consistently expanding and securing its solid market position. At the same time other coconut businesses haven risen and fallen. The reasons for Sambu success include:

- Integrated kernel processing, with incremental investments in new products, allows the company to differentiate its products and to optimize investments.
- Vertical integration of the whole supply chain enables Sambu to maximize supply chain value with stable supply of input in terms of cost, volume, and quality.
- Large scale operations deliver economies of scale and the capacity to supply diverse product range to major markets

- Good social welfare for employees as the basis for long term sustainable operations

5.2 Peter Paul Philippines

Development of integrated kernel processing from desiccated coconut production

Peter Paul Philippines was primarily founded in 1946 for the purpose of manufacturing desiccated coconuts to supply its parent company in the US but is now an independent company. Over time, the company has established production facilities to produce other coconut products, such as coconut milk and cream, coconut water, virgin coconut oil, coconut flour, copra, copra cake, coconut oil, paring cake, paring oil, and other residual products, thus consolidating its strengths in the creation of an integrated coconut processing plant. Nowadays, desiccated coconut is still a core competency of Peter Paul Philippines. It currently operates the largest single production facility of desiccated coconut in the world, with a rated capacity of 22,000 metric tons per year.

Focus on quality

Since its inception, Peter Paul Philippines has built its reputation for excellent and consistent quality coconut products. The company's stringent standards can be seen in its HACCP, ISO 9001 and Organic certification (for both US and Europe) into its quality system.

Factories near international port

Peter Paul Philippines' facilities are located to give proximity to the Philippine business centre and international port facilities. The proximity has also been an important asset in achieving prompt delivery and reliable customer service.

Worldwide markets, including major brands

Peter Paul Philippine's products are seen in all major markets such as North and South America, Europe, Asia and the Middle East, and maintain a substantial share in each of these markets. There customers are among today's established household name brands in confectionery, cookie and cereal industries.

Continuing to add high value products, like VCO

Peter Paul has constantly invested in research and development of new products. For example, its latest product is "Pure and Clear" Virgin Coconut Oil. Having the largest single production facility in The Philippines, this latest product is distributed to all leading supermarkets in the country starting with the 24 branches of SM Supermarkets nationwide.

Peter Paul Philippines's achievement has been made possible by:

- Development of integrated processing enables the company to differentiate its products and improve profitability;
- Mass production: Focus on its original core business activity, i.e. desiccated coconut at large volume, helped Peter Paul to gain more competitiveness through reduction of production cost. These economies of scale now underpin an efficient integrated processing operation;
- Research and development keeps the company constantly ahead in the market through provision of high value products
- Strong linkages in export markets, through its original parent in USA, and in its home market

5.3 Renuka Group, Sri Lanka

An internationally competitive integrated kernel processor in a high cost industry

Reunkua Group is a diversified conglomerate. A major part of the Group's operations are in the food and beverages sector. In this regard, it is very much a food & beverage company specializing in Coconut products, Ethnic foods, Organic Foods and Tea, as opposed to a specialist coconut processing company.

Incremental development from DC to integrated processor

Its coconut operation date back to 1976, beginning with desiccated coconut manufacturing and export. Six years later it pioneered the manufacture of value added products such as creamed coconut. In 1989 it added organic coconut products to its range, obtaining the first organic certification in the Sri Lankan coconut industry.

Joint ventures for better market access

In 2000, the company invested in a state-of-the-art coconut manufacturing facility in with two joint venture partners from the food supply and distribution sectors in North America and Europe, Grace Foods UK (formerly WT Foods Ltd) and Terfloth & Cie Canada.

Its factories have adopted HACCP, ISO22000 standards, good manufacturing practices, personal and environmental hygienic standards and currently have installed Rotary Sterilisers, Infusion Aseptic System, Three Stage Spray Drier and much more.

Nucleus plantation and out-growers

The company operates a vertically integrated business, having it's own nucleus plantations and a network of out-growers in the coconut growing district (known as the Coconut Triangle). They operate 3 manufacturing companies linked to coconuts - The Renuka Agro Exports Ltd, Renuka Agrifoods Ltd & Coco Lanka Ltd. These 3 manufacturing facilities are located within a radius of 30km from Colombo and its port.

Specialist divisions target different customer segments

In the market, Renuka Foodservice Division offers a coconut product range in convenient packaging designed for the food service sector. Renuka Ingredients Division provides total coconut-based food ingredient solutions to food producers, confectioneries, beverage manufacturers, bakers and caterers – offering both standard and customised product solutions.

Major international customers

The company claims 90% share of the Sri Lankan export market for creamed coconut, liquid coconut products & defatted coconut. Its customers include Tesco, Marks & Spencer (UK), Metro, Aldi, Plus (Germany), Carrefour (UAE), Woolworths (S/Africa), among others.

The company's success in a high cost industry can be attributed to:

- Constant evolution of new products and manufacturing – beginning in DC but now fully integrated kernel processing
- Investment in high quality technology and processes
- Strong links to end-markets, including through joint ventures
- Scale of operations support a diversified product range
- Commercial strength of parent group has enabled the active development of the company

5.4 Wonderfarm / Interfood Processing Industry Ltd, Vietnam

**A successful
Malaysian-owned
integrated
manufacturer of
coconut products
in Vietnam**

All major
operations
relocated to
Vietnam

Integrated
processing of
kernel products

For domestic and
export markets

Interfood Processing Industry Ltd, with its “Wonderfarm” brand, is an investment by Trade Ocean Exporter Sdn Bhd, founded in 1977 in Malaysia. In 1991, the company invested in a manufacturing facility in Vietnam to continue its growth in international export markets, but also to tap into the growing Vietnamese market.

Vietnam was chosen as it was found to have changed substantially, offering excellent prospects with good labour resources, rich agriculture products and a growing home market. Over the last 15 years all manufacturing, international marketing and R&D divisions have moved to Vietnam. The company is optimistic about the future in Vietnam and is currently significantly expanding its production facilities.

Its previous experience has enabled the company to become one of the most modern food manufacturers in Vietnam and one of today's biggest and quality focused confectionery and beverage producers in Vietnam. Coconut products, including coconut juice/drinks, coconut milk/cream, and desiccated coconut, are a key stream of the company's production but they also now make a wider range of other processed food and beverages..

The “Wonderfarm” brand was awarded with the Vietnam High Quality award, given for consistency in production quality. The coconut products of Interfood have been successfully marketed in both overseas and the domestic market.

The success of Interfood Processing Industry indicates that:

- The coconut industry in Vietnam is attractive to foreign investment, especially from more advanced neighbouring countries such as Malaysia and Thailand,
- Production of high value coconut products, like coconut milk/cream, is both possible and commercially profitable under Vietnamese conditions;
- Domestic market has potential for selected products
- Vietnam-based manufacturers can compete in export markets, in terms of both price and quality.

5.5 Hayleys Export and HayCarb

**World leading
coir and activated
carbon businesses**

Each business
specialise in one
area

Hayleys Exports PLC and Haycarb are sister companies in Hayleys PLC group - a Sri Lankan multinational company with businesses in Coir, Rubber, Environment, Agriculture, Plantations, Transportation, Inland Marketing, Knitted Fabrics and Tourism.

Hayleys Exports PLC, deals with coir fibre exports while Haycarb is the world's biggest manufacturer of coconut activated carbon

Hayleys Exports PLC is one of the largest designers, manufacturers and exporters of coir fibre and coir fibre products and a pioneer manufacturer and exporter of coconut coir erosion control products in

Hayleys Export

A wide range of coir products to maximise value

Raw material supply limits in Sri Lanka

Looking overseas for expansion, cautiously

Haycarb

Major producer of activated carbon

Moved to high value niche applications

Factories in Sri Lanka, Thailand and Indonesia

Marketing through subsidiaries and long term distributors

Strong growth, looking overseas

the world.

Their products include: Mattress / bristle / twisted fibre, coir twine, geotextiles, erosion control blankets, vegetation fascines and coir beds. These products are used in brush manufacturing, mattress industry, automobile upholstery, erosion control and agriculture.

The company has achieved considerable success from its Sri Lanka operation. However, it remains in need of additional raw materials as supply in Sri Lanka has reached its economic limit. The company recognizes that an off-shore production facility is a more efficient solution than importing materials. The company has a negative track record of joint ventures, following a poor experience in China. Therefore Hayleys Exports has an interest, in principle, to investigate the feasibility of an investment in Ben Tre. However, there are concerns about Vietnam and the Silvermills joint venture in particular.

Haycarb, founded in 1973, is the world's leading manufacturer of coconut shell activated carbon. Their product range covers standard, washed, and impregnated carbons in granular, pellet and powder forms. Activated carbon presently has a wide range of applications in air, gas and liquid purification and precious metal recovery. In addition to its wide scale usage in water purification, solvent recovery and waste water treatment, Haycarb's products have moved up the activated carbon value chain to serve high value niche applications such as vehicle cabin air filters, military and industrial gas masks, high purity water, for the electronic industry, medical applications, cigarette filters and pharmaceutical industry.

Haycarb manufactures 24,000 MT per annum and operates two production centres in Sri Lanka, one in Thailand and one in Indonesia. As part of the manufacturing, they sell electricity back to the government electricity company at market price.

The company markets through subsidiaries in Thailand, Australia and UK as well as through independent exclusive distributors elsewhere, who add value through further processing according to clients' needs. With a sales turnover of US\$380 million per year, about 90 % of production is for export and 50 % of exports go to the US. The company has long term distribution contracts and direct sales to large companies. Growth is being driven by US EPA and FDA considerations.

Haycarb is growing at 20 % per year. The company imports charcoal to meet production requirements. Fourteen years ago the company set up export operations for charcoal in Ben Tre that went well for four years. However, specifications varied and volumes fell, even with a Haycarb person on site. The company considered investing in Ben Tre, but decided on Thailand - where they now have a factory.

Both companies have been particularly successful in developing export led husk and shell businesses for high value applications but are now facing raw material shortages in their home industry.

As well as generating good returns for themselves, the businesses create demand for shells and husk and value for the rest of the industry. They show that it is possible to consume a large volume of coconut shell and husk for high value export products.

Tropicoir, Sri Lanka

Tropicoir Lanka was founded in 1997 committed to the task of offering high quality, **A world leading pith business with a joint venture led business model** environmentally safe coir-based substrates to professional horticulture and floriculture growers around the globe. Its products include: grow bags, coco cubes, blocks, bags, briquettes, coco husk chips, coir feed and mulch and roof top gardening products.

Joint Ventures in key end market

Since it was founded, it has built several successful Joint Venture companies (Tropical International, Euro Substrates and Growrite Substrates) with professional substrate manufactures from the Netherlands, New Zealand and Korea to cater to the growing demand for coco substrates in these markets.

These partnerships help create close relationships with clients to keep pace with changing technologies in the global horticultural market. Tropicoir has developed a wide range of crop specific products for hydroponic growing of flowers, vegetables and fruits through constant dialog with growers.

High quality innovative products

It's Joint Ventures's, Euro Substrates and Growrite Substrates, have emerged as tow of the world's leading high quality coir based substrate providers due to continuous product development through introduction of innovative and advanced production techniques. Furthermore, Euro Substrates has multiple supply sources through its production facilities in Sri Lanka, India, and Dominican Republic while Growrite is among the most advanced coir based substrates processing facility in the world with the ability to meet the need for consistent growing media.

Tropicoir's uncompromising commitment to quality and determination to find the right solution for diverse needs of professional growers gives them a competitive edge in today's high-tech horticultural production. Supply flexibility is also a key strength of the company.

Raw material supply limits in Sri Lanka

Discussions indicate that the company is evaluating another supply source in the East Asian region for their next investment in 2010 due to raw material supply limits in Sri Lanka. The Philippines is the main candidate site for expansion as the company has already identified the necessary land and raw materials are plentiful. The company also has good relations with Covina – a Korean company with operations in the cocopith industry in Ben Tre.

Future growth through overseas production

The reasons behind Tropicoir's success include:

- a focus in innovation and quality, enabling Tropicoir to secure its market position through provision of a wide range of products for specific customer needs;
- business partnership with distributors in key markets, including Europe, Japan, Korea, Australia, New Zealand, and Middle East
- successful overseas expansion to maintain raw material supply and growth

5.6 Cocogreen Technologies Corp. (COCOTECH), The Philippines

An ethically driven, for-profit husk fibre and pith business

Coco Technologies Corporation (COCOTECH), with its major partner Juboken Enterprises, Inc. is the leading bioengineering company in the Philippines. More than just a business venture, COCOTECH aims to address the growing global problem of land degradation, while economically empowering the marginalized coconut farming communities.

60% of revenues paid to producer families and communities

COCOTECH aspires to contribute to the immediate rehabilitation of degraded lands while, at the same time, providing livelihood opportunities to low-income families. As part of its goal of economic empowerment for marginalized communities and households, more than 60% of revenues go directly to producer-families and/or communities while 50% of after-tax income supports sustainable enterprise projects – i.e. projects that are ecologically sound, economically viable and community oriented.

An expanding range of products

The company engages in the manufacture and marketing of coconut husk related products. Specific products manufactured are baled decorticated fibre, soil erosion control products, horticultural products and coconut fibre pads. The company also designs and implements bioengineering and erosion control installation. The domestic market is the anchor market and the company provides bundled consultancy services on erosion control and bioengineer as a way of stimulating demand for its husk products. Exports are also now sizeable.

Consulting services are key part of strategy to grow market

Outworked networks in poor communities

The company operates with subcontracting and sister companies in the coconut producing areas all around the country. The production of coir geotextile nets by the company has provided livelihoods to families in several poor communities. The system involves the coir processing plants under COCOTECH providing the coir to families in the nearby community who then convert them into 10 meter twines using simple twining wheels. The plant then collects the twines where the families are paid per 10 meter twine produced. At the processing plant, the twines are woven into geotextile nets. The plants are located near poor rural communities with surplus labour and limited income opportunities.

Pith processing through innovative technology

Pith processing and sales is a more recent addition to the business. Pith drying is done at community level using heat recovery systems from coconut shell charcoal kilns. This greatly reduces the drying and processing costs.

COCOTECH is constantly seeking ways to enhance the products and technology in coco coir processing. Its coconut coir processing equipment, a product of Filipino ingenuity, was developed and fabricated locally, and demonstrates high efficiency in coconut fibre processing. The pith drying system is another example of the company's innovation.

The company is an excellent example of the potential for commercial success in tandem with strong social impacts from husk fibre and pith industries. It also demonstrates the potential to developed domestic markets for such products with the appropriate marketing strategies.

5.7 Common themes in business success

Alongside the examples outlines above, there are dozens of other successful business cases in Thailand, Malaysia, Philippines and elsewhere. Many of them share the same common themes:

- The markets and skills required to be successful as a manufacturer of coconut products from the three different parts of the nut (kernel, husk, shell) as very different. This mean that there is little benefit in fully integrated whole nut processing. The most successful businesses specialise on one of the three areas.
- For kernel processing, the most successful businesses:
 - have incrementally evolved integrated processing business models, often starting as simple DC or oil millers
 - differentiate their products through integrated processing and a continuous process of diversification and new product development
 - now make, as a minimum, coconut milk/cream, coconut milk powder, as well as traditional desiccated coconut and defatted coconut (residue).
 - have added coconut drinks and virgin coconut oil to their product range more recently
 - still retain production of their original products, eg. DC or oil, but with profit growth driven by investment in higher value products
 - can thrive, even in higher cost local industry, if using an integrated processing business model
- To maintain competitiveness, research and development, quality control, and customer service are major focuses of businesses in all three sub-sectors
- International distribution networks are essential and Joint ventures (or long term relationships) with partners in end markets are often an important part of the success of export led companies
- Domestic markets also have potential, if marketing activity is properly addressed
- Manufacturing sites with easy access to ports are a major advantage
- Businesses need to be of a medium scale, providing them:
 - management capacity to successfully access export markets
 - sufficient volume to support a diversified product range
 - production volumes to achieve processing efficiency
 - resources to invest in ongoing product research and development

Other successful businesses in Thailand and Malaysia include:

- Asiatic – Thailand
- Ampol Food Processing Ltd – Thailand
- Korn Thai – Thailand
- Linaco manufacturing – Malaysia
- Stancodex – Malaysia
- M & S Food Industries - Malaysia
- Kapar Coconut Industries – Malaysia

And the list goes on.

6 Lessons from the rest of the world

6.1 The key conclusion: Move quickly to a high value-added industry

Ben Tre must move to a high value added industry

The most striking conclusion is that there is both an opportunity and an increasingly urgent need for the coconut industry in Ben Tre, and the wider Mekong Delta, to move up the value curve and become a high value-added industry.

The opportunity

Sizeable markets for higher value products

Sizeable markets exist for a range of high value products from all parts of the coconut, both domestic and export. While only a fraction of the size of the main coconut commodity markets, they are still sufficient to provide good market opportunities for an industry of the scale of Ben Tre.

Target integrated kernel processing and full use of husk

The local industry could realistically raise the value added per 1000 nuts from its current level of USD 250 to around USD 520, by investing in the manufacture of commercially proven higher value products through integrated processing of the kernel and full utilisation of the husk fibre and pith for finished products and the shell.

The existing conditions in Ben Tre are favourable to moving to a high value added industry:

Realistically double value added to USD520/000 nuts

- There is a sizeable and stable domestic demand for coconut candy – a high value product
- There are already examples of successful integrated kernel processors in Vietnam, serving both domestic and export markets
- Ben Tre has recently succeeded in attracting foreign investment into similar new integrated processing factories
- Several DC businesses operate in Ben Tre and these would be a natural starting point for investment to diversify into integrated processing businesses
- Vietnam already has established demand for coconut residues for feed, currently being imported from the Philippines, but would be a by-product of integrated kernel processing by the local industry
- A few smaller businesses have already proven the market for high value finished husk fibre products and pith products and nearly all husks already enter the processing industries (although not yet for these high value products)
- There is a rapidly improving business environment and infrastructure, with HCMC now just 2.5 hours by road and a highway under construction.

Proven pathway for businesses and industry

Good foundations in current industry

The need

Ben Tre is high cost producers	The industry already has high nut costs by international standards and is not competitive in the mainstream commoditised coconut products of DC and Oil, especially in relation to the very large, low cost production capacity in the Philippines and Indonesia.
Not competitive in coconut commodities: DC or Oil	The rise of palm oil, especially in domestic edible oil markets in coconut producing countries, threatens to turn the recent slow growth of coconut oil markets into outright decline. If this becomes reality, the global industry could see major surplus supplies of coconuts and a worldwide collapse in coconut prices. Without a recovery in demand, a major restructuring of the industry would be likely. High cost producers competing in coconut commodity markets, as is currently the case for Ben Tre, would likely see a large scale collapse of their industry as demand moves to lower cost volume producers. High value added industries, outside of the commodity markets, would be best placed to withstand such market conditions – as their competitive advantage comes from the efficiency of utilisation of the entire nut for value added products and a diversity of end markets, as opposed to simple competition on the lowest price of a nut.
Palm oil may trigger collapse in coconut commodity prices	
Need to compete on value added not lowest cost nuts	
Need to sustain higher farmer income for supply security	Regardless of the future impact of palm oil in the market, there is already pressure on farmers to look for higher income uses of their land. Neighbouring countries, such as Thailand and Malaysia, have seen steep declines in coconut production as farmers have switched to other crops. Maintaining higher farmer incomes is therefore important for the security of raw material supply. The two most effective mechanisms for achieving this are intercropping and moving to an efficient, high value added industry that can still be competitive even with higher nut prices

6.2 Detailed insights

6.2.1 Production and supply

Ben Tre among the most competitive terms of yields	Ben Tre is already among the most competitive industries in terms of yields. There is scope for raising yield by around 15% - from 7,700 up to 9,000. This is worth pursuing as it will raise farmer income from coconut and, put downward pressure on nuts prices, helping the industry be more competitive. Demand for nuts in Ben Tre is strong so this is unlikely to create a surplus and collapse in nut prices.
Ben Tre has high nut prices	Ben Tre is already a relatively high cost production area. Nut prices are similar to Sri Lanka but 2-3 times higher than in the Philippines and Indonesia. It is therefore not competitive in bulk commodity product markets such as DC or oil.
Sustainability depends on good income to farmers	To avoid a loss of production area, the industry needs to aim to be able to generate good income for farmers – even above current levels. The alternatives are both undesirable – either following the route of India or Philippines with coconut farmers being trapped in poverty or, like Thailand and Malaysia, seeing coconut trees being cut down and

replaced by other crops. Efforts to reduce nut prices without increasing overall farmer income through other mechanism may provide short term benefits to business but would quickly prove to be highly counterproductive for the industry.

There are two main ways to sustain higher farm incomes: intercropping and achieving higher average nut prices. Yield increases are a third, and possibly smaller, mechanism.

Intercropping is widespread in the global industry

Cocoa promising for half of Ben Tre coconut growers

Intercropping is widespread in the global industry and is highly desirable. In Ben Tre, intercropping with cocoa appears to be an attractive option for both market and technical reasons. However, only around 50% of coconut land in Ben Tre is suitable for cocoa production. Intercropping on the remaining coconut land is also highly desirable but feasible options need to be explored further.

Higher nut prices need:

High value added industry

Healthy competition

Higher average nut prices can only be achieved if two conditions exist:

1. a majority of nuts are bought by a high value-added industry cluster that makes full use of the entire nut and is able to maintain competitiveness even with high nut prices (see chart)
2. healthy competition and demand for nuts is maintained among buyers, thus leading higher value-added business to raise nut purchase prices to economic levels to secure supply.

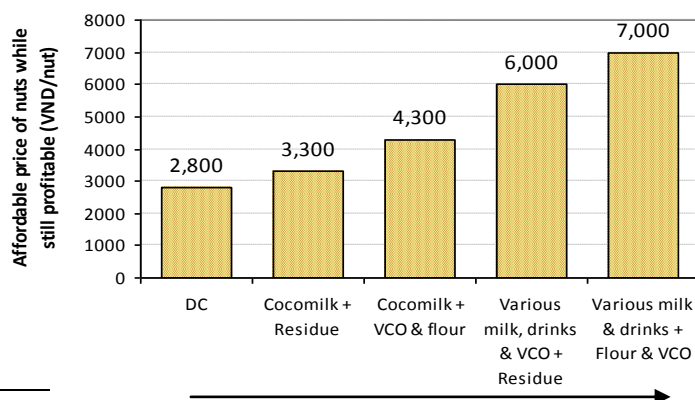
Integrated kernel processing vital

For integrated kernel processing, individual businesses provide good examples, with Thailand as the best examples at an industry level.

High value husk industries bring diversity and strength to entire industry

Sri Lanka's export processing industry is the best role model for nearly full use of the entire nut, especially for value added husk fibre and pith products. It shows that the development of high value husk fibre and pith industries can make very significant contributions to the value created by the industry as a whole and helps Sri Lanka's businesses be competitive while maintaining high nut price. These industries also provide much needed diversity of end markets. This may be especially important if there are major upheavals in the coconut commodity markets.

Figure 21: Rising breakeven nut prices with increased integrated processing⁴⁷



Integrated kernel businesses profitable with very high nut prices

⁴⁷ Using current prices for finished goods & estimates of costs of goods sold from company interviews and research. This exclude any contribution to farm gate prices from higher value husk processing.

6.2.2 Industry structure and positioning

Ben Tre needs high utilisation for high value products	Ben Tre is a high cost producer so will need to compete on a value-added basis, through high utilisation rate for higher value-added products and also focusing on quality and value provided to customers. It is unlikely to be able to compete in the commoditised product markets, such as DC or oil, except where these are produced as part of integrated processing businesses.
Near-full use of entire nut is a realistic objective	The near-full use of the whole nut is a realistic objective – Sri Lanka's export industry comes somewhere close. Ben Tre is not far behind and appears to have an advantage over other countries as much of the raw material is already in the processing stream, and not lost in the domestic fresh nut industry or at the farm level. However, the challenge for Ben Tre is to make higher value products from the coconuts it processes.
Kernel and husk are both important	The ratio of potential value creation of Shell: Husk: Kernel is roughly 1:10:25 (15:150:350 USD /000 nuts), In terms of employment it is perhaps 1:3:3. The big employers are the husk fibre and coconut candy businesses, not counting on farm work.
Ben Tre could more than double value created	Ben Tre is currently achieving around USD 250 per 1000 nuts. Shifting its DC industry and a large part of raw exports to integrated processing (or candy production) as well as higher value husk fibre and pith products would generate >USD520 per 1000 nuts under current market prices.
Coconut candy is valuable part of industry	Coconut candy is a valuable part of the industry and should be encouraged, but its growth potential is as yet unproven but worth testing further in mainstream export markets with improved packaging and finishing and possible adjustments to the formulation.
Authorities should encourage DC business and others to invest in integrated processing	Integrated processing of kernel, within each business, is a highly effective business model and the key to a successful and sustainable high value industry. End markets are reasonably diversified, as there are several different products, and most have growth potential. A key action for the local authorities is therefore to encourage diversification of existing DC and kernel businesses into integrated processing and attract new investment from overseas businesses and domestic food processing companies.
Help existing high value husk fibre and pith businesses to grow	Markets exist for finished husk fibre products and for pith products, and are already being supplied on a small scale by a few local businesses. These should be expanded significantly by supporting the growth of the existing makers of high value products and current producers of low value products being encouraged to develop high value product lines and markets.
Employment creation in villages as well as factories	As well as higher nut prices, job creation can be an important contribution of the industry – especially through production of finished husk fibre products and coconut candy. For fibre,

Quality standards will matter in an export led industry

employment is often on an outworker basis, especially useful in targeting under-employed women and men in their own villages.

Ben Tre will inevitably continue to be an export led industry. As such product standards will be important, as in the Philippines. Many of the kernel products are for human consumption and so will need to comply with international sanitary and phyto-sanitary standards as well as manufacturing and agricultural standards, such as HACCP, GMP or GAP. Developing local capacity in these will be important. For coconut specific standards, such as a standard for low fat coconut milk versus coconut cream, these could be developed if judged necessary for the market. The Philippines has a wide range of standards already developed for different products. These would be a good starting point for any standards that need to be developed. For any local standards, appropriate certification and monitoring regimes would need to be established.

Healthy competition should be maintained

Ben Tre has good levels of competition among nut buyers so the market is likely to be efficient in transmitting price changes down to farm level. This competition needs to be maintained at a healthy level. In this regard, the authorities should try to avoid any one or two businesses achieving dominant market positions in either the kernel or husk industries.

Aim for “Goldilocks” level of competition: –

*“not too much,
not too little,
but just right”*

The objective in terms of competition is to achieve a healthy, “Goldilocks” level of competition - “not too hot - not too cold, but just right”. Too much competition can lead to over capacity across the industry while having too many smaller uncompetitive businesses that then rely on driving down nut prices to survive. Too little competition and farmers will not benefit from the additional value being created as dominant businesses earn higher revenues but hold down nut prices.

While subject to market forces, the local authorities should consider the desired level of competition in their plans for each sub-sector - assessing maximum raw material supply capacity and output and attracting right size and number of enterprises. The appropriate use of investment permits and incentives can be a valuable tool in helping to achieve the desired level of competition.

An example of unhealthy competition is the oil industry in The Philippines. A small number of giant millers have dominant market positions while at the same time, historic market distortions have led to large scale over capacity. The businesses now find themselves competing on price and driving down nut prices. This stifles farm production and yields and is counterproductive in the long term.

Market limits not a major constraint in near future

6.2.3 Markets

Ben Tre is a relatively small produce by international standards. However, it is sufficient to be an important player in some of the markets for high value kernel and husk products. Market limits are not likely to be a major factor during the next few years, but if there is a

Domestic markets for some products should not be ignored

	<p>very large expansion of any specific niche product then attention will need to be given to ensure it does not trigger a market collapse.</p> <p>Domestic demand for high value products can be important to coconut processing industries.. Examples include – VCO in the Philippines, Candy in Vietnam, milk and drinks in Thailand, coir yarn and nets in India. Domestic market potential should therefore not be ignored in Vietnam.</p>
Selected products may be under exploited	<p>Some products may be currently under exploited in export and domestic markets and may be worth testing further in the marketplace. These include:</p> <ul style="list-style-type: none"> • Coconut shell powder as resin additive – for both domestic and export markets • Coconut milk, cream, ice cream, and drinks – for domestic markets • Coconut candy - for mainstream export markets • Cocopeat (from pith) - in domestic horticulture (niche) and land improvement (bulk) • Coconut flour – for domestic bakery and confectionary
Organic products will be valuable niche for some businesses	
Large domestic demand for main by-product from integrated processing – kernel residues	<p>Organic products are a valuable niche product for many successful integrated processing businesses. This could be valuable in Ben Tre and could be linked to organic cacao production. It is not likely to be very extensive in scale, but could still be valuable especially as coconut milk and drinks are often marketed on health grounds.. Given the naturally high yields, Ben Tre may have a competitive advantage in organic production.</p> <p>Vietnam already has established demand for coconut residue for feed of over 100,000 MT per year, currently being imported from the Philippines. By comparison the total output of residues from integrated processing of 200 million nuts – the amount not consumed by candy processors – is around 40,000 MT per year. There is therefore an excellent opportunity to market this local. Current import buyers should be identified and contacted to understand their requirements and confirm the potential to substitute local supply for current imports.</p>
China is growing market	
Investment in integrated processing increases profits	<p>China appears to be a growing market, especially for high value kernel products, although firm data is difficult to obtain. Efforts to better understand the market in China are likely to be highly valuable to both the authorities and businesses in Ben Tre.</p>

6.2.4 Enterprise level issues

Investments in integrated kernel processing models are not only good for the overall industry but are a good investment for individual businesses, especially those currently producing DC. Such investments have been proven commercial successes on many occasions. The commercial benefits to individual business can be seen in the rising

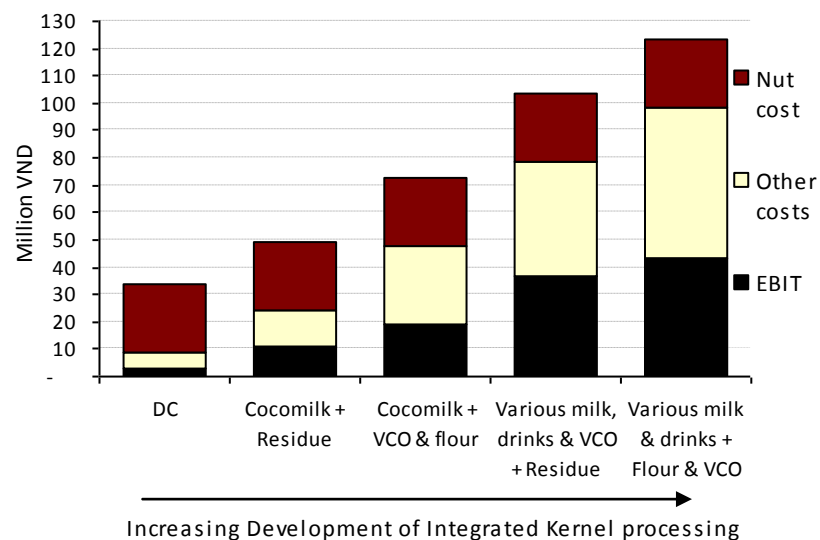
profits⁴⁸ as business move to increasingly sophisticated integrated processing (see chart).

Most of the modern, integrated processing businesses began as desiccated coconut processors or oil millers. They gradually added related product lines to make them the big integrated coconut

⁴⁸ Calculated as the Earnings Before Interest and Tax – “EBIT”

Figure 22: Rising profits with increased integrated processing⁴⁹

Big increase in profitability are possible from integrated processing



Similar production lines easy migration from DC to integrated processing

processing enterprises that they are today. This pathway takes advantage of the fact that there are similar processing steps between coconut milk and desiccated coconut production, so it is very easy to integrate these two product lines. Similarly, liquid coconut milk processing and coconut water can share the same UHT packaging or canning system so they can be integrated as well.

Technology available "off the shelf"

Technology and equipment are now widely available from commercial equipment suppliers for all major products from integrated kernel processing and high value husk fibre and pith products.

Size matters

However, successful integrated kernel processors are not household or village based enterprises but are genuine medium sized businesses. Some degree of scale helps them achieve the necessary diversity of products, production economies, gain access to export markets and invest in ongoing product development.

Food businesses as well as coconut business have been successful

For investment in integrated kernel processing there are several different types of business that have been successful:

- Integrated food businesses investing back down the supply chain
- Specialist coconut businesses selling a range of coconut products, often having evolved from DC or oil businesses.

Neighbouring countries may have businesses interested in Ben Tre

Businesses in several countries are understood to be looking for offshore investment opportunities, potential in Ben Tre, including Thailand, Malaysia, Sri Lanka and China. Given the current attractiveness of Ben Tre as an investment site and the relatively small

⁴⁹ Values are per 10,000 nuts processed – a typical daily amount for a small-medium scale factory with an throughput of 3 million nuts per year. Estimates use current prices for finished goods & estimates of costs of good sold from company interviews and research.

Smaller local husk business have already found high value markets

scale of the industry, the local authorities are well positioned to be selective in ensuring the right type of businesses invest in the local industry and fit with the overall industry strategy.

Local husk and pith businesses for higher value products appear to have already identified markets and customers but need to access finance for investment. This will be valuable to the overall industry and so should be supported.

Finally, at an enterprise level the Integrated processing of entire nut is not a good business model, as the markets and skills are too different and there is little synergy between them.

Enabling environment is important

6.2.5 Sector Enabling Environment and Regulation

A strong Sector Enabling Environment can greatly help the development of a vibrant, competitive industry. In the last two years Ben Tre has made very good progress in improving its general business environment. The same pro-active approach should now be applied to addressing the sector specific policy and business environment issues.

Good recent progress should be continued

The current effort to establish an effective industry association as well as the multi-stakeholder development of an industry strategy should be continued. The Philippines' industry association, UCAP, is a good example to follow. Mechanisms for ensuring the financial sustainability of any industry association need to be considered in the context of the relative scale of the local industry.

Research and development encouraged at business and industry level

For sustained competitiveness, research and development of products, markets and manufacturing should be encouraged, both at an individual business and industry level. Sri Lanka and the Philippines appear to have both benefited significantly from their research capacity.

Pith pollution requires both market approach and regulation

A major regulatory challenge for the authorities in Ben Tre is ensuring that the industry grows without damaging the local natural environment. Pith pollution is currently a major issue and is intrinsically linked with successful husk businesses. Sri Lanka is the only example where market mechanisms have effectively dealt with this issue. As such, the authorities in Ben Tre should consider two complimentary mechanisms for addressing this: stimulating investment in pith processing businesses while at the same time significantly strengthening environment pollution enforcement regimes in the industry.

7 Impact potential from the industry

7.1 Socio-economic impacts

The coconut industry in the Mekong Delta has three main mechanisms through which it impacts household incomes and the local economy.

1. on-farm income from coconut sales
2. paid labour, in processing and other enterprises
3. taxes paid by coconut businesses

Taking Ben Tre as an example, simple estimates of the relative size of total income from on-farm sales and paid labour are as follows:

On-farm income from coconut sales:

In Ben Tre, total annual household income from coconut industry	<ul style="list-style-type: none"> • Total annual production = 310,000,000 nuts • Sales price (2008 ave. est.) = 2500 VND/nut • Total on-farm income = 775 billion VND
VND 1,100 billion (USD 64 million)	= 44 million USD

Paid labour income:

~ 70% on-farm sales	<ul style="list-style-type: none"> • Paid jobs in industry = 19,000⁵⁰ full time equivalent • Daily pay (average, un/skilled) = 60,000 VND/day • Total paid labour income = 342 billion VND
~ 30% paid labour	= 19 million USD

An estimated
19,000 workers

These simple estimates suggest that in Ben Tre, total annual household income from the coconut industry is around VND 1,100 billion (USD 64 million) and that on-farm coconut sales contribute 70% of this.

7.2 Coconuts and poverty

To facilitate international comparison, the analysis of poverty and the coconut industry has been completed using the following income poverty lines:

Poverty lines:	
\$1.25 / day per capita PPP	• USD 1.25 per day ⁵¹ per capita at 2005 purchasing power parity (PPP)
\$2.50 / day per capita PPP	

⁵⁰ The industry was reported to have 15,400 workers by 2005, with annual growth rate 7.5% since 2002. If this growth in worker numbers is assumed to have continued then there will now be 19,000.

⁵¹ This is the international extreme poverty line referenced in the Millennium Development Goals. (<http://www.undp.org/mdg/goal1.shtml>) Note that the 2008 Millennium Development Report Addendum has updated the \$1/day (PPP) poverty line to \$1.25/day (2005 dollars), based on new World Bank analysis. In local terms the updated \$1.25/day line equates to VND 2.943 million per cap. per year. This compares to the current nationally defined line (MOLISA) of VND 2.4 million per cap. p.a.. Stated poverty rates and poverty gaps will therefore be higher than nationally published figures.

- USD 2.50 per day per capita – 2005 PPP

In the Mekong Delta, coconut farmers have similar poverty rates to all rural households

In Ben Tre, coconut farmers are poorer than other rural households

Comparing coconut selling household with all rural household

Across the Mekong Delta, coconut households have very similar poverty rates to all rural household against both the \$1.25 PPP and \$2.50 PPP poverty lines.

However in Ben Tre, coconut selling household are poor than the wider rural population, with poverty rates of 12.5% and 11.5% respectively against a \$1.25/day extreme poverty line. This is also the case against the higher \$2.50/day poverty line.

Targeting the development of coconuts in Ben Tre is therefore likely to deliver disproportionately more benefits to the rural poor and near poor rather than to richer households in the Province.

Against a \$2.50/day poverty line - Rural Ben Tre is poorer than the rural Mekong Delta.

Against a \$1.25/day extreme poverty line - Rural Ben Tre is richer than the rural Mekong Delta

Comparing Ben Tre with all coconut provinces in the Mekong Delta⁵²

Against a \$1.25 PPP extreme poverty line, rural household in Ben Tre are less poor than rural household in the Mekong Delta, with poverty rates of 11.5% and 14.8%, respectively. An even bigger difference is seen in terms of poverty gaps⁵³, which in Ben Tre is 0.018 compared to 0.033 in the Mekong Delta (a difference of 46%).

However, against a \$2.50 PPP poverty line the situation is reversed, with rural households in Ben Tre poorer than rural household in the Mekong Delta, with poverty rates of 54.4% and 53.5%, respectively.

This suggests that Ben Tre has a large number of households with income just above the extreme poverty line of \$1.25 PPP, as can be seen by the peak in population distribution between upper and lower poverty lines in Figure 23.

Table 5: Poverty incidence and poverty gap for coconut selling and rural households in the Mekong Delta and Ben Tre - \$1.25/day PPP

	Mekong Delta		Ben Tre	
Rural areas only	Poverty incidence	Poverty Gap	Poverty incidence	Poverty Gap
All households	14.8%	0.033	11.5%	0.018
Coconut selling household	14.9%	0.032	12.5%	0.019

Source: VHLSS06

⁵² The main Mekong Delta coconut provinces are taken as: Ben Tre, Tra Vinh, Tien Giang, Ca Mau, Kien Giang, Vinh Long, Hau Giang, Bac Lieu, An Giang, Soc Trang, Con Thuy, Long An

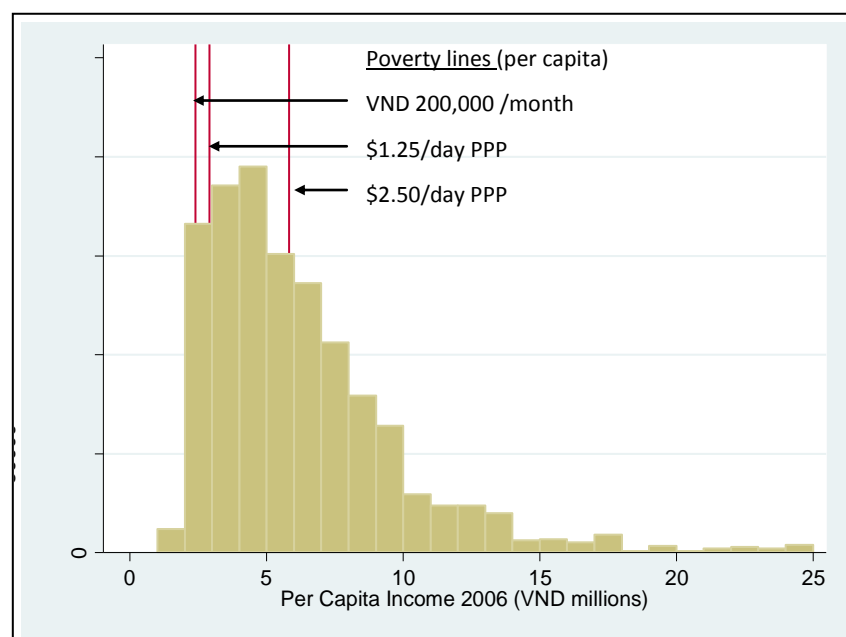
⁵³ Poverty gap is the average income gap below the poverty line of the poor population. For example if the average income for the poor is \$100/year, and the poverty line is \$150/year, the poverty gap is \$50/year or a ratio of 0.30

Table 6: Poverty incidence and poverty gap for coconut selling and rural households in the Mekong Delta and Ben Tre - \$2.50/day PPP

	Mekong Delta		Ben Tre	
Rural areas only	Poverty incidence	Poverty Gap	Poverty incidence	Poverty Gap
All households	53.5%	0.192	54.4%	0.181
Coconut selling household	54.2%	0.195	55.7%	0.186

Source: VHLSS06

54% of coconut farmers live on less than \$2.50 per day

Figure 23: Histogram of Per Capita Incomes⁵⁴ and Poverty Lines in Ben Tre, 2006

Source: VHLSS06

Ben Tre has many households just above extreme poverty

7.3 Poverty impact potential from the industry

From on-farm income increase

The industry analysis presented elsewhere in the report suggests that there is significant scope for the coconut industry in the Mekong Delta, and Ben Tre in particular, to raise their competitiveness and value creation in the industry.

Specifically, on an industry scale similar to that of Ben Tre, there is evidence that the value created by a large part of the industry could increase from the current level of USD 250 per 1000 nuts to more than USD 500 per 1000 nuts – a 100% increase in value added.

Value added could be raised to >\$500 /000 nuts – 100% higher than today

⁵⁴ The x axis is truncated at VND 25 million. This means 12 of the 702 sample households in rural Ben Tre are excluded from the graph.

Competition and higher value added should raise coconut prices

Rising coconut prices reduce poverty

With greater value creation and strong competition in the local industry, farm gate prices for coconuts can be expected to rise. An increase in farm gate prices is likely to be the most important mechanism for poverty impact, given that on-farm sales income is the most important mechanism for local household to benefit from the industry and that coconut farmers are poorer than the rural average.

Increases in farm gate prices of coconuts will lead to higher household income for coconut sellers without addition costs or labour and therefore, across the populations, a reduction in poverty rates.

The following changes in poverty can be estimated using VHLSS06 data for an increase in average farm gate prices⁵⁵ of coconuts of 25%, 50% and 100% compared to 2006 levels.

Table 7: Poverty impact potential among coconut selling household in rural areas

Ben Tre only	Poverty Line	\$ 1.25 / day PPP				\$ 2.50 / day PPP			
	Price rise	Poverty head- count	People leaving Poverty	Poverty inci- dence	Poverty Gap	Poverty head- count	People leaving Poverty	Poverty inci- dence	Poverty Gap
	% over 2006	(people)	(people)	(%)		(people)	(people)	(%)	
	2006	129,200	-	12.5%	0.019	575,083	-	55.7%	0.186
	25%	93,622	35,578	9.1%	0.011	550,357	24,726	53.3%	0.163
	50%	60,981	68,219	5.9%	?	515,278	59,805	49.9%	?
	100%	43,535	85,665	4.2%	0.005	438,636	136,447	42.4%	0.116

Mekong Delta ⁵²	Poverty Line	\$ 1.25 / day PPP				\$ 2.50 / day PPP			
	Price rise	Poverty head-count	People leaving Poverty	Poverty incidence	Poverty Gap	Poverty head-count	People leaving Poverty	Poverty incidence	Poverty Gap
	% over 2006	(people)	(people)	(%)		(people)	(people)	(%)	
	2006	740,539	-	14.9%	0.032	2,693,534	-	54.2%	0.195
	25%	658,006	82,533	13.2%	0.028	2,635,051	58,483	53.0%	0.185
	50%	592,974	147,565	11.9%	0.025	2,578,943	114,591	51.9%	0.177
	100%	518,629	221,910	10.4%	0.022	2,432,829	260,705	49.0%	0.163

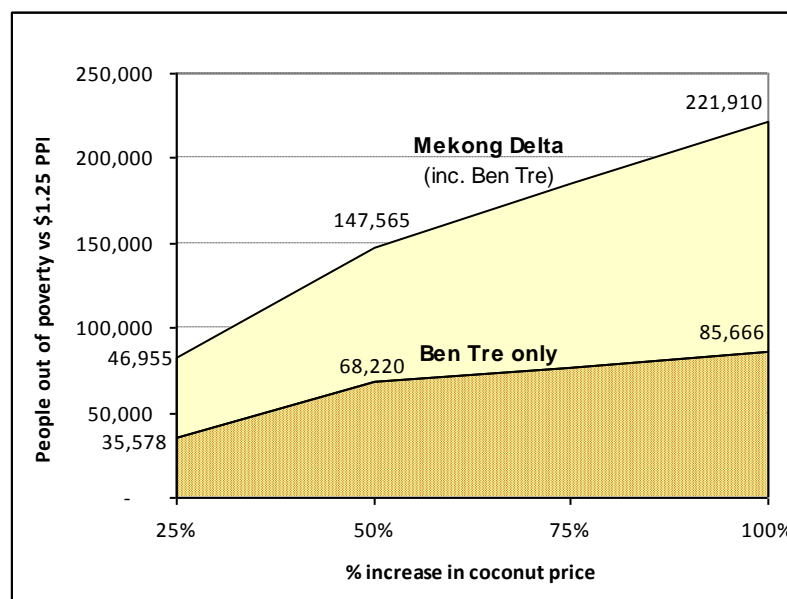
⁵⁵ Note that this analysis does not assume any increase in the volume of nuts sold or yields.

Figure 24: People out of poverty (on-farm) from rising coconut prices

A 50% increase in coconut prices leads to:

68,000 people out of poverty in Ben Tre

148,000 people out of poverty in Mekong Delta



This analysis indicates that 40%-45% of the on-farm impact from an increasingly competitive coconut industry would occur in Ben Tre province.

From increased wage labour demand

The coconut industry employs an estimated⁵⁰ 19,000 workers in Ben Tre and an unknown number in the Mekong Delta. The following analysis therefore relates to Ben Tre only.

Higher labour demand from improved industry

Raising the competitiveness of the industry will require changes in several areas that will have an impact on labour demand in the industry as set out in Table 8. However, the shift of existing businesses from DC to integrated processing is expected to be broadly neutral in terms of employment creation.

The increased labour demand from these changes can be expected to be partially offset by improved production efficiencies as businesses invest in new processing equipment and themselves become more efficient operators. With improved investment and management practices a 10% improvement in labour productivity could be expected across the industry.

Job creation especially important to functionally landless

Additional off-farm job opportunities are especially important in provinces such as Ben Tre where agriculture land per household is very low, below 0.5 hectares per household. It is also particularly important for the functionally landless for who cannot benefit from on-farm income opportunities. In neighbouring Tra Vinh Province, the

second largest coconut producing province in the Mekong Delta, 40% of poor households are functionally landless⁵⁶.

Table 8: Employment creation in an improved coconut industry⁵⁷

Improved industry in Ben Tre may create 5,000 – 10,000 new jobs, Most new jobs in fibre processing to finished products	Change in industry	Job creation
	1. Increased volume of processing of raw nuts in the local industry as processors are able to compete with the price paid by export buyers for bulk volumes of raw nuts. Assume 50% reduction in raw exports (60 million nuts equivalent)	1,000
	2. Increased processing of husk fibre into finished products, rather than just to bailed fibre. 50% of bailed fibre into geotextile OR 100% of bailed fibre to geotextile	5,000 OR 10,000
	3. Increased collection and processing of pith (near full utilization)	2,000
	4. Increase labour productivity with new investment – assumed to be 10%	(3,000)
	Total job creation in Ben Tre (FTE) in improved coconut industry	5,000 – 10,000

Impact in Ben Tre, 35,000 – 70,000 people out of poverty

plus

5,000 – 10,000 jobs

The additional labour demand from an improved coconut industry will contribute to a tightening of the local labour market and higher wage rates across the province. However, the impacts of this on household incomes and poverty has not been estimated.

Combined impacts in Ben Tre

The combined impact of an improved coconut industry in Ben Tre from increased on-farm incomes and new job creation from can be estimated to be in the order of:

- + 35,000 – 70,000 people of out poverty, on farm from a sustained average increase in coconut prices of 25%-50%
- + 5,000 – 10,000 new FTE jobs

Cocopith dumping is major issue

7.4 Environmental Impacts

⁵⁶ IFAD Rural Impact Monitoring System survey, 2008, conducted for the IFAD IMPP Tra Vinh project

⁵⁷ Job creation estimates are based on actual numbers of workers and factory capacities for specific target products gathered from interviews with business in Ben Tre, Sri Lanka, the Philippines and Thailand. These are supplemented with data from manufacturing exports on labour input needs for different steps in the manufacturing process for DC and integrated processing.

Water pollution
5-10 times over
acceptable levels

At present the main negative environmental impact from the coconut industry in Ben Tre comes from the husk industry and the dumping of coco pith into local water ways. Local authorities estimate that only 20% of cocopith produced is used by locally for fertilizer or purchased by a few small-scale pith processing companies. The rest of the cocopith is stored in storage area along the river banks. When the storage areas are full, the fibre processors dispose the pith in the river causing pollution, affecting the water supply of local people and damaging local aquaculture. Local authorities are very aware of this issue and have taken initial steps to identify potential solutions. However a comprehensive solution has not yet been achieved.

Water quality test conducted by the provincial Department of Natural Resources and the Environment in 4 different areas along the Thom river⁵⁸ in 2006 showed that all the indices exceed the acceptable level according to the national TCVN 5942 – 1955 – Water quality – Standard quality of water surface:

Development of
cocopith industry
and stronger
regulation both
needed

- Biochemical Oxygen Demand (BOD) index is 22mg/l, 5.5 times over the national standard of 4mg/l
- Coliform: 45,000 MPN/ 100ml, exceed the standard of 5000 MPN/ 100ml by 9 times
- Total suspended solids (TSS) is from 49 – 77 mg/l, exceeding acceptable level

Development of a viable cocopith industry combined with strengthened environmental regulation and enforcement regimes should achieve very significant reductions in water pollution from the industry, and within national water quality standards. This would be a very significant positive impact from the industry's future development.

⁵⁸ A major branch of the Mekong River

8 Coconut Industry Strategy Recommendations for Ben Tre

The following section outlines recommendations for a coordinated coconut industry strategy for Ben Tre as the heart of the industry in the Mekong Delta.

Strategic goal	The goal for the Ben Tre coconut industry should be to become an internationally competitive and sustainable coconut industry that maximises the value created across the industry for businesses and coconut farmers, through profitable businesses, employment creation and attractive and stable coconut prices for farmers
Industry objectives	<p>The objectives for the overall industry should be to:</p> <ul style="list-style-type: none"> A) Maximise the value-added across the industry by greatly expanding production of higher value products, especially from the kernel, husk fibre and pith, B) Sustain a healthy level of competition among coconut buyers and processors, C) Ensure raw material supply security by generating attractive incomes for coconut growers, and D) Ensure the environmental sustainability of the industry, in particular by addressing pollution from various sub-sectors.
Sub-sector priorities	To achieve these objectives specific priority actions for each of the main sub-sectors, and the corresponding rationale, are summarised below.
Kernel sub-sector	Kernel use is currently divided almost equally between coconut candy, DC and raw exports. Coconut candy is a high value product and a valuable part of the industry. DC is a low value product and increasingly uncompetitive in world markets. Raw exports can generate high value but are intermittent and unreliable and create significant disruption in the local industry.
Rationale	
Priorities	<ol style="list-style-type: none"> 1. Existing DC businesses, and other interested businesses, should be assisted to invest in diversifying their operations to become integrated kernel processing businesses with each business manufacturing several products in parallel – such as milk products, flour or residue products and, over time, drinks, VCO and other high value products. Specific activities should include support to selected businesses on: <ul style="list-style-type: none"> a. Technology and equipment selection and implementation b. Customer and market identification c. Facilitating access to finance (only if needed) d. Export promotion 2. New domestic and foreign investment in integrated kernel

processing should be promoted. Potential domestic investors should be sought among the integrated food processing industry (as in Thailand) and existing integrated coconut processors operating elsewhere in Vietnam. Foreign investors should be sought in Thailand, Malaysia, China and, possibly, Sri Lanka. Immediate activities include:

- a. Promote investment opportunity to Vietnam based integrated food processing businesses. Facilitate investment, if interest, with a focus on technology transfer.
 - b. Promote investment opportunity to potentially interested overseas businesses – targeting China, Thailand, Malaysia and Sri Lanka. Facilitate investment, if interest
3. Candy processing businesses should be encouraged and support provided to test mainstream export market potential while maintaining existing markets. Activities include:
- a. Assess feasibility of market test of candy into mainstream export markets with progressive coconut candy businesses,
 - b. Complete market test and export promotion, in line with feasibility assessment, potentially with adjusted formulation and improved packaging.
4. No new investment in DC or other low value kernel products should be supported. Immediate activities should include:
- a. Announcement of priority products and business areas for investment
 - b. Updating provincial Investment Incentives Framework and SME support policies to reflect new priority business areas

**Husk fibre
sub-sector**

Rationale

Priorities

The husk fibre sub-sector is already highly efficient in obtaining almost all available husks for processing. However, the vast majority of its output is low value intermediary and semi-finished products, such as bailed fibre. There are some smaller businesses already making and exporting high value finished husk fibre products. The husk industry creates over 110,000 MT of coco pith every year, most of which is not properly disposed of and ends up being dumped into nearby rivers.

5. Renewed environmental enforcement regimes should be implemented, to ensure all husk businesses are held fully accountable for the proper disposal of the pith they produce. (See below for specific activities).
6. Existing businesses making higher value finished fibre products, such as coir rolls, coir bag, geotextiles and similar products should be assisted to expand their operations. Support to selected businesses should include:
 - a. Facilitating access to finance

- b. Export promotion support of high value fibre products (only if needed)
7. Businesses currently producing and exporting large volumes of bailed fibre and other low value product should be encouraged to invest in producing higher value finished fibre products. Specific activities should include support to selected businesses on:
- a. Technology and equipment selection and implementation
 - b. Customer and market identification
 - c. Facilitating access to finance (only if needed)
 - d. Export promotion of high value fibre products

**Husk pith
sub-sector**

Rationale

8. No new investment in low value and intermediary husk fibre product should be supported. (See Priority 4, above, for activities)

Priorities

The vast majority of pith is not currently used or disposed of properly, despite recent interest from 3-5 local businesses in selling pith based products, like coco peat and substrates. The current situation is environmentally unsustainable and threatens to undermine the wider husk fibre industry and, as a result, the entire coconut industry in Ben Tre. Most industries worldwide have also struggled with this problem. Only Sri Lanka has found market based mechanisms to use the majority of pith produced. For Ben Tre, both proper environmental regulation and market-driven mechanisms will be necessary to tackle this problem.

9. Commercially viable businesses making higher value finished pith products, such as agricultural substrates and soil conditioners, should be supported to expand their operations. Support to selected businesses should include:

- a. Facilitating access to finance
- b. Facilitating access to suitable land and infrastructure
- c. Export promotion support of high value pith products

(only if needed)

10. Domestic market opportunities for pith based products should be investigated and tested.

- a. Conduct survey of potential domestic market segments, identifying customers and estimating likely volumes and prices.
- b. If viable growth opportunities identified in domestic market, support should be given to selected businesses to complete initial sales and marketing, if needed.

11. Existing environmental regulations and enforcement regimes should be reviewed and strengthened to ensure husk fibre businesses are all held accountable for the proper disposal of the pith they produce.

12. Progressive mechanisms for both enforcements and market based solutions should be investigated and piloted, for example receipt schemes for pith disposal, linking husk fibre businesses with pith product manufacturing business.

**Farm level
priorities****Rationale**

In addition to the need to achieve sustained higher nut prices through the priorities outlined elsewhere, positive steps have been taken at the farm level to improve the income of coconut growers. These include the promotion of intercropping with cocoa and in promoting increased yields. Intercropping has the greatest potential impact but intercropping of cocoa is only suitable for around half the coconut growers.

Priorities

13. Promotion of cocoa intercropping should be supported in suitable areas, primarily through the DARD led programme but with the avoidance of direct production subsidies if possible.

- a. Specific mechanism for supporting the DARD cocoa development programme, potentially through the IFAD funded DBRP project, should be implemented but with the avoidance of direct production subsidies if possible.

14. For areas not suitable for cocoa intercropping, additional research and trials should be conducted on alternative intercropping or production systems to raise farmer income, including assessment of potential from aquaculture or livestock raising as well as crops. Specific actions include:

- a. Review previous research and trials on alternative intercropping systems
- b. Identify any systems warranting further investigation and piloting, in terms of likely cost, benefits and risks to individual households and market viability
- c. Conduct field trials of promising systems and scale up successful pilots, where identified.

15. Current activities to promote yield improvements, through improved varieties and better management practices, should be supported if they are confirmed to be cost effective in raising farmer incomes, especially in areas not suitable to cocoa intercropping.

- a. Review current yield promotion activities, in particular within DARD, to assess evidence of cost effectiveness and benefits at household level of different activities, e.g. improved varieties versus improved management practices.
- b. Review targeting of current activities against areas that are suitable versus not suitable to cocoa intercropping
- c. Prepare updated action plans for support, based in most cost effective mechanisms and prioritising non-cocoa areas, if feasible

Sector enabling environment priorities	The wider business enabling environment is improving rapidly in Ben Tre and positive efforts have been made in relation to the coconut industry, with the current launch of a new industry association. Ben Tre already has numerous coconut businesses, good competition and has succeeded in attracting new investment into the industry recently for higher value product areas. However, at present there is little research and development or innovation within local businesses and limited awareness of wider market issues and opportunities.
Rationale	
Priorities	<p>16. The local authorities should complete specific analysis to determine the target number and capacity of different types of businesses within the industry based on realistic assessments of the supply base. Initial activities should include:</p> <ul style="list-style-type: none"> a. Audit of current capacity and volumes of production, (ideally combined with the survey of businesses for the publication of the Industry Directory) b. Detailed analysis of target industry capacity and business numbers in specific product groups for each sub-sector. c. Targeting of investment promotion activities should be set based on the above audit and detailed target analysis. <p>17. Several areas of current business regulations and support policies should be reviewed to assess the specific benefits or constraints they have on the development of a high value coconut industry. Activities should include reviews of:</p> <ul style="list-style-type: none"> a. Tax regulation and their application within the industry b. Investment and SME support policies and mechanisms for priority businesses, especially in terms of access to land, infrastructure, training support etc. <p>18. The new Industry Association should be supported to become vibrant and sustainable, including helping provide selected services to the industry. Specific activities include:</p> <ul style="list-style-type: none"> a. Preparation of a plan to achieve financial sustainability of the Industry Association b. Publication of an industry directory of local businesses and other associated organisations c. Review of the business service needs and expectations of the local businesses and development of plans to facilitate these with support from the Association and other agencies and programmes. Desired services may include market intelligence, equipment supplies, GMP/GAP/HACCP advisors and certification. <p>19. Research and development within the local industry should be actively promoted. Initial activities should include:</p>

- a. Review and piloting of potential mechanisms and incentive schemes to promote business led R&D, including financial and non-financial incentives.
 - b. Review of current public research and development activities against new industry priorities
 - 20. Access to relevant market intelligence within the local industry should be improved. In the medium term this should, in part, be through the Industry Association. However, in the short term other agencies and programme should conduct the following activities:
 - a. A review of the coconut market and industry in China, focusing specifically on market opportunities for priority products and potential inward investments businesses
 - b. Detailed market research for coconut milk products for domestic and international markets.
 - c. Linking local businesses making higher value products to existing export promotion programmes within Vietnam
- Environmental priorities**
- Rationale** Enforcement of appropriate environmental regulations remains a weakness for the industry and is in urgent need of improvement. While the main acknowledge pollution concern is from pith, local authorities need to ensure that all sub-sectors of the industry reduce environmental pollution below regulated safe levels and dispose of processing wastes appropriately.
- Priorities**
21. The local authorities should develop and implement a comprehensive environmental action plan for the industry. Specific activities should include, if not already completed:
- a. An environmental impact assessment (EIA) of each sub-sector and specific product/business groups.
 - b. Review and strengthening of current environmental regulations and enforcement regimes, inline with the findings of the environmental impact assessments.
 - c. Development of an industry environmental action plan based on the above EIAs and review, with clearly defined responsibilities, milestones and resources
 - d. Inclusion of appropriate waste treatment and by-product disposal plans and implementation should be included as a condition in all new investment licenses, for both existing and new enterprise. Mechanisms for ensuring compliance should also be developed and implemented.
22. Pith pollution should be seen as an urgent priority and a parallel approach of market-based use of pith and renewed environmental regulation and enforcement should be implemented. Immediate activities include:

- a. A detailed review of current obstacles to effective enforcement of appropriate environmental regulations specifically in regard to pith disposal.
- b. Feasibility assessment, and piloting, of a receipt scheme (or other mechanisms) to ensure appropriate pith disposal, using market-based use of pith combined with appropriate regulation and enforcement.

Acronyms and Glossary

List of Acronyms

APCC	Asian Pacific Coconut Community
BOD	Biochemical Oxygen Demand
CAGR	Compound Annual Growth Rate
CDA	Coconut Development Authority (Sri Lanka)
CME	Coconut Methyl Ester
CRDTC	Coir Research Development and Training Center
CRI	Coconut Research Institute
DC	Desiccated Coconut
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FOB	Free On Board
FTE	Full Time Equivalent
GAP	Good Agriculture Practice
GMP	Good Manufacturing Practice
GNP	Gross National Product
GVA	Gross Value Added
HACCP	Hazard Analysis Critical Control Point
IFAD	International Fund for Agricultural Development
IPC	Investment and Promotion Centre (Ben Tre)
ISO	International Standards Organization
ITI	Industrial Technology Institute
MT	Metric Tonne
PCA	Philippines Coconut Authority
UCAP	United Coconut Association of the Philippines
USD	United States Dollar
USDA	United States Department of Agriculture
VCO	Virgin Coconut Oil

Glossary of terms

Copra		Dehydrated coconut kernel
Coco chemical (oleo chemicals)		Oleochemicals are chemicals from oil which are either plant or animal based fats and oil or synthetic (petroleum based). Coco chemical is oleochemical derived from coconut oil
Coconut activated carbon		A form of carbon that has been processed to make it extremely porous and thus have a very large surface area available for adsorption or chemical reactions
Coconut cream		Coconut cream has higher fat content than coconut milk
Coconut fiber (coir)		Found between the husk and the outer shell of a coconut
Coconut fiber dust (cocopeat, coir pith, coir waste, fiber waste)		Spongy material that binds the different types of coconut fiber in the coconut husk
Coconut flour/ defatted coconut		The ground solid residue obtained after immediate extraction of oil from a dried comminuted coconut meat that is processed under sanitary condition/ obtained from further processing of the residue from coconut milk extraction.
Coconut milk		The white fluid obtained when fresh grated or comminuted coconut meat or kernel is pressed either by manual or mechanical means with or without the addition of water
Coconut powder	milk	Coconut milk in solid powder form much like the consistency of dairy milk powder
Coconut oil		Obtained by drying the coconut kernel and then extracting oil from granulated dried kernel through the use of high pressure mechanical press or a combination of high pressure mechanical press and solvent extraction
Coconut charcoal	shell	Product derived from carbonization of coconut shell from fully matured nuts under a limited or controlled amount of air
Coconut flour/ powder	shell	Light brown, free flowing powder which is obtained by pulverizing shell of mature coconut
Coconut vinegar		An alcoholic liquid from coconut water that has been soured
Copra meal		Solid residue that separates out when coconut oil is extracted from copra. Normally sold in cake or pellet form
Desiccated Coconut (DC)		Pure white, particulated shredded dehydrated food product obtained from fresh pared coconut kernel and processed under very strict sanitary conditions.
Husk chips		Coconut husks from matured nuts which are sliced and cut in to ½ or 1 inch size particle or chips and sun-dried to a moisture content of 14% and below.
Processed coconut water		Obtained from processing coconut water to prolong shelf-life

Virgin Coconut oil Oil obtained from fresh mature coconut kernel by mechanical or natural means, with or without the use of heat, without undergoing chemical refining, bleaching or deodorizing, and which does not lead to the alteration of the nature of the oil

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Useful Links

1. Coconut Development Authority – www.cda.lk
2. Asian and Pacific Coconut Community – www.apccsec.org
3. United Coconut Associations of the Philippines, Inc. – www.ucap.org.ph

Annex 1 - Business interviews in Ben Tre

A series of interviews (based on designed questionnaire) were completed at the end of 2008 and early 2009 with a number of coconut processors in Ben Tre. The purpose was to investigate the coconut supply chain, coconut processing business, and the production cost of these businesses. Interviews were conducted with businesses from small to large scale, operating in different areas of DC, coconut candy, coconut jelly, fiber, pith, charcoal, nut traders. Businesses interviewed are list below.

	Product area	Company name	Interview time
1.	Kernel- DC	Sivermill Betrimex JV	Aug 2008
2.	Kernel- DC	Hong Phuoc	Aug 2008
3.	Kernel- DC	Dinh Phu My	Nov 2008
4.	Kernel- DC, oil	Thanh Vinh	Nov 2008
5.	Kernel- DC, milk powder	DC Industries Co. Ltd (Malaysia)	Nov 2008
6.	Kernel- Coconut candy	Thien Long	Nov 2008
7.	Kernel- Oil (from brown skin)	Khanh Thanh	Nov 2008
8.	Water - Coconut jelly	Minh Tam company	Aug 2008
9.	Water - Coconut jelly	Huy Phong	Jan 2009
10.	Water - Coconut jelly	Minh Chau	Jan 2009
11.	Water - Coconut jelly	Cuu Long	Jan 2009
12.	Various - Charcoal, Fiber and DC	Betrimex	Aug 2008
13.	Husk - Fiber and charcoal processor	Nguyen Thi Tong	Aug 2008
14.	Husk - Fiber processor	25 Aug Fiber Company	Aug 2008
15.	Husk - Fiber processor	Sau Nhu company	Aug 2008
16.	Husk - Fiber processor	Pham Hong Son	Nov 2008
17.	Husk - Coir net	Pham Van Hoa	Jan 2009
18.	Husk - Coir net, twine	Nguyen Thi Phuong	Jan 2009
19.	Husk - Mattress	Thanh Binh	Jan 2009
20.	Husk - Coir net, mattress	Hung Long	Jan 2009
21.	Husk - Pith processor	Covina Co. Ltd	Nov 2008
22.	Husk - Pith processor	Dat Sach Soiless and Biosoill	Nov 2008
23.	Shell - Charcoal	My Phat	Jan 2009
24.	Shell - Charcoal	Tran Van Nha	Jan 2009
25.	Shell - Charcoal	Tran Van Phong	Jan 2009
26.	Shell - Charcoal	Huy Vu	Jan 2009
27.	Nut trader, kernel pre-processor	Le Minh Chau	Aug 2008
28.	Nut trader and fiber processor	Phuoc Thinh	Nov 2008

Annex 2 - Comparative data on selected countries

Overview	Philippines	Sri Lanka	Thailand	Ben Tre
Coconut plantation area (hectare)	3,311,000	395,000	226,000	40,000 (Ben Tre) 133,000 (Vietnam)
Production (in 1000 nuts)	12,600,000	2,784,000	1,284,000	300,000 (Ben Tre) 618,000 (Vietnam)
Change in area 2002-06 (%)	+4%	-11%	-31%	+4% (Ben Tre)
Ranking in production (nuts)	2 nd largest producer	5 th largest producer	Small producer	Small producer
Ranking in export (value)	1 st largest exporter	3 rd largest exporter	No clear data	Small exporter in every product
Yield - nuts (nuts/ha/yr)	Nearly 4,000 (44 nuts/ tree/ year, 100-120 trees/ ha) ⁵⁹	6,700 ⁶⁰	11,000 ⁶¹	7,700 but could achieve around 10,000 (50-60 nuts/tree/ year, 200 trees/ ha) ⁶² (Ben Tre)
Yield - copra (MT copra/ ha/yr)	0.747	1.329	1.654	1.2
Nut weight - average (gram)	1200	1400	No clear data	1600 – 1800 (Ben Tre)
Domestic consumption (% of total)	25% (3160 mn nuts) Mainly as oil	85% (2451 mn nuts) Highest per capita consumption of coconut in the world (use as curry nuts or edible oil)	75% (936 mn nuts) High domestic consumption but in processed form from food industry – coconut cream/ milk/ powder/ beverage	37% (138 mn nuts) Coconut candy (main usage, 30%) Food preparation at household or fresh drinking (7%)
Coconut sector turnover (US\$ 1000)	1,465,279	707,331	n/a – missing and contradictory data in APCC	111,993
Export turn over (US\$1000)	1,076,871	220,259	25,130 ⁶³	76,581

⁵⁹ Philippines Coconut Statistics 2007

⁶⁰ Information from the Department of Census and Statistics, Sri Lanka

⁶¹ Information from Thailand Department of Agriculture

⁶² Ben Tre IPC

⁶³ Thailand, APCC 06 – know to be only partial as exclude coconut products from food processing

Products & Exports	Philippines	Sri Lanka	Thailand	Ben Tre
Export processed products – contribution of different parts to revenue	Kernel: 75%, Husk: 1%, Shell: 24%, Water: minor	Kernel: 47 %, Husk: 42%, Shell: 11%, Water: minor	n/a – missing and contradictory data from APCC 06.	Kernel: 55 %, Husk: 38%, Shell: 6%, Water: minor
Kernel	80% Oil, 11% DC, 5% oleo chemical and 4% for others non traditional products Involve heavily in low value commodity product	70% DC, 14% Copra, 5% Milk powder, 4% VCO, 4% liquid milk, 3% for others Produce low value commodity product but still have other high value added products (cream/milk/powder, etc)	Food products such as coconut cream, liquid milk, milk powder, etc (but may not register under coconut category) Fresh nuts export for drinking (to US, Singapore, EU)	51% raw nuts, 37% DC and 12% coconut candy (mostly in domestic market) Simple and underdeveloped product mix, especially for export
Average value creation of kernel (\$/1000nuts)	112	179	No clear data (Believed to be >300, but no firm data)	184
Husk	Baled fiber only Pith is almost fully wasted	Well developed and sophisticated product portfolio with high value added products such as twisted fiber, geo textile, coir yarn, coir mould, etc	Small and low value husk processing. No use of pith	Majority as baled fiber, some higher value product Limited use of pith
Average value creation of husks processed (\$/1000 nuts)	20	81	17	41
Shell	Number 1 exporter in shell charcoal and activated carbon 82% Activated carbon, 18% charcoal	5 th largest exporter of activated carbon 95% Activated carbon, 5% charcoal	2 nd largest exporter of activated carbon No export of charcoal	100% Shell charcoal No activated carbon
Average value creation of shells	14	19	No clear data	16

processed (\$/1000 nuts)				
Water	Alcohol, vinegar and water but in a very small volume (vs total production)	Alcohol, vinegar but in a very small volume (vs total production)	Canned beverage	Coconut jelly for domestic use and export
Average value creation of water (\$/ 1000 nuts)	No clear data	No clear data	No clear data	13

Utilization	Philippines	Sri Lanka	Thailand	Ben Tre
Kernel	100% usage	100% usage	100% usage	100% usage
Husk	65% used as fuel for drying copra 5% turned into coir products 30% rotten at farm	30% turned into coir products for exports (note this is 2x the number of nuts processed for export) The balance 70% might be retained at farms, used as fuel or wasted	20% processed for export, mostly as bailed fibre	96% husks are utilized for export, mostly as bailed fibres
Pith (of available pith from husk processing)	Wasted	65% processed for export, some used locally The balance is waste	<3% processed for export some used locally Majority is waste	<20% used locally, Remainder dumped as waste
Shell	76% of shells for charcoal for domestic market 24% of shells available are exported, mostly as activated carbon (96%) and charcoal.	43% exported mainly as activated carbon (note this is equivalent to almost 100% of processed nuts) No recorded data on usage of the balance as at household level	Activated carbon unknown utilization rate	42% of shells available exported in the form of charcoal The balance might be used domestic as fuel (no recorded data)
Water	n/a	n/a	n/a	n/a
Institutions	Philippines	Sri Lanka	Thailand	Ben Tre
Institutional structure	Well established -Government agency	Well established - Coconut	No association or organization	Being developed:

	<p>(PCA –Philippine Coconut authority)) with the infrastructure of research Center, Training Center, laboratories and Seed Production centers.</p> <p>- Association for each group of participants by sub-sector</p> <p>-Umbrella association UCAP – United Coconut Association of the Philippines</p>	<p>Development Authority (CDA) under Ministry of Plantation Development</p> <p>-Coconut Research Institute</p> <p>-Coir Research Development and Training Center</p> <p>-Industrial Technology Institute</p>	for coconut sector	<p>- Coconut Research Centre, long established in Ben Tre,</p> <p>- New Industry Association being launched in August 2009</p>
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Annex 3 - Contact details for selected coconut enterprises

Company	Country	Correspondence	Products	Tel	Fax	Email	Website
KERNEL PROCESSING CONTACTS							
Coconut Palm Group	China	41 Longhua Road, Haikou, Hainan, P. R. China Zip Code: 570102	Coconut Juice	(0086898) 66777124	(0086898)667738 91	web@yesheu.co m	http://www.yesheu.c om/english.asp
Linaco Manufacturing (M) Sdn Bhd	Malaysia	NNo.12, Lintang Sungai Keramat 2B, Taman Klang Utama, 42100 Klang, Selangor Darul Ehsan, Malaysia	Coconut milk, coconut cream powder, low desiccated coconut, export to 30 countries	+603-3291 4589	+603-3291 4588	linaco@linaco.c om.my	www.linaco.com.my www.Linacoasiaep.c om
Jastar Food Industries Sdn Bhd							
Felix Koch Flavours & Fragrances (M) Sdn Bhd							
Standcodex Sdn Bhd	Malaysia	16, Jalan Teknologi 3/1, Kota Damansara, 47810 Pertaling Jaya, Selangor, Malaysia.	Coconut cream & powder, low desiccated coconut, coconut dairy creamer	+603-6156 1391 +603-6157 6701	+603- 6157 0326	Info@standcodex .com	www.standcodex.co m

Kapar Coconut Industries Sdn Bhd	Malaysia	Lot : 4813, 15 1/2 Mile, Jalan Kapar, 42200 Kapar Selangor Darul Ehsan, Malaysia	Instant cocomilk powder, low fat desiccated coconut, Coconut extract, exported to German, HK, Middle East & Singapore	+603-3250 8052 / 3250 6464	+603-3250 6564	kcisdn@tm.net.my	kaparcoconut.com kaparcoconut.asiaep.com
M & S Food Industries Sdn Bhd	Malaysia	19 & 21, Persiaran Rishah 7, Silibin Industrial Estate, 30100 Ipoh, Perak. Malaysia.	Coconut cream,/milk, DC, packaged coconut water	+605-526 3116 / 3117 / 3118	+605 - 526 3119	msfood@msfood.com.my	Msfood.com.my
S & P Food Industries Sdn Bhd	Malaysia	S&P Food Industries (M) Sdn Bhd (98816-A) No. 27-2, Jalan PJU 5/13, Dataran Sunway, Kota Damansara 47810 Petaling Jaya, Selangor Darul Ehsan, Malaysia.	Coconut milk/cream powder,	+(603) 6157 2226	+(603) 6157 5226	info@sfood.com	www.sfood.com
Sensori food industries	Malaysia	Lot 6, Jalan Pemaju U1/15, Seksyen U1, Hicom Glenmarie Industrial Park, 40150 Shah Alam, Selangor	Coconut milk/cream powder, canned/sterilized/frozen milk, low/high fat DC, grated coconut	+603-5032 2288	+603-5032 2280	Submitted through website (Business enquiry site)	www.sensorifood.com

H.O.T ree Industries	Malaysia	Lot 178, Batu 13, Jalan Bagan Dato, 36400 Hutan Melintang, Perak Darul Ridzuan, Malaysia	Desiccated coconut, coconut cream powder	+605-6412469	+605-6413469	hotree@tm.net.my	hotree.com hotree.asiaep.com
ASIATIC	Thailand	11 floor Modernform Tower 669 Srinakarin Rd., Suanluang Bangkok 10250 Thailand	Coconut milk, coconut juice	+66 (0) 2722-9377	+66 (0) 2722-9389	export@asiatic.co.th	Asiatic.co.th
Ampol Food Processing Ltd	Thailand	392/56-57 Soi Preechapanich, Maharat Rd. Praborommaharajwang, Phranakorn District, Bangkok 10200	UHT Cocomilk & other types of cocomilk products	+66(0) 2622-3434	+66(0) 2226-1829	ampol.pr@ampolfood.com	Ampolfood.com
Chef's choice food	Thailand	99/9 Mu 5, Banggruay - Jongthanom Rd., Banggruay, Nondaburi 11130 Thailand	Coconut juice & other foods	(662)447-5537-8	(662)447-5472		chefschoicefoods.com
Korn Thai Co.,	Thailand	413 Soi Khema Pattanakarn Road, Suanluang, Bangkok, Thailand, 10250	Coconut cream powder/non-dairy creamer, canned coconut milk	(66) 2319-3455	(66) 2319-3456	h_office@kornthai.com	Kornthai.com
Merit Food products	Thailand	39/16 M.3 Nongkangkook, Muang Chonburi, 20000 Thailand	Coconut drinks, virgin oil coconut, organic coconut plantation	+66 3879 9101-3	+66 3879 9100	info@meritfood.com	Meritfood.co.th
Suree Interfoods	Thailand	11/13 M.3, T. Banbor, A. Muang Samutsakorn, 74000, Thailand	Coconut milk, cream, juice	+6634 419400	+6634 419448		Sureeinterfoods.com

Thaiagri Foods Public	Thailand	155/1 Moo 1 TheParak Road. Bangsaothong, Bangplee, Samutprakarn 10540 Thailand.	Coconut milk	(662) 315-4171-6	(662) 315-4169		Thaiagri.com
Adamjee Lukmanjee and Sons	Srilanka	140/5, Grandpass Road, Colombo 00014, Sri Lanka.	Coconut oil, copra, desiccated coconut, milk, powder, virgin coconut oil...	00 94 11 244 54 21	00 94 11 244 54 26	adamjee@adamjeelukmanjee.com	www.adamjeelukmanjee.com
Renuka Group	Srilanka	Renuka House, 60 Sri Jinaratana Road, Colombo 02 - Srilanka	Desiccated coconut, coconut milk/cream, drinks, sweeten coconuts...	0094-11-2314750-5	0094-11-2445549	inquiries@renukagroup.com	Renukagroup.com
COIR & FIBRE PROCESSING CONTACTS							
Tropicoir	Srilanka	90 A, Pagoda Road, Pitakotte, Sri Lanka.	Horticultural products (coco husk chips, coir substrates...)	+94 11 5 522770	+94 11 2812585	janindha@tropicoir.lk	Tropicoirlanka.com
Hayleys exports	Srilanka	Hayley Building, 400, Deans Road , Colombo 10, Sri Lanka	Mattress fibre, twisted fibre, geotextile, coir logs, control blanket, coconut husk chips...(Variety of fibre products)	2696331-6	2699299	com@hayexpo.hayleys.com	www.Hayleys-exports.com

Malaysia Coconut Coir Industrial Sdn Bhd	Malaysia	1545 Jln Alma Bukit Minyak 14000 Bukit Mertajam, Bukit Mertajam 14000, Penang	Coconut coir products	604-5393141	604-5385078		
SHELL PROCESSING CONTACTS							
Haycarb PLC	Srilanka		Activated carbon, green carbon,..	+94 11 2627000 - General	+94 11 2699630	haycarb@haycarb.com	Haycarb.com
M-Trex Active Carbon	Malaysia	22, Jalan Sibu 8, Tmn Wahyu,, Kuala Lumpur, Malaysia, 68100	Activated Carbon	60 3 62519541/ 60123660039	60 3 62577510		