Four Pillars of Sustainable Palm Oil Production in Thailand

with comparison of the

Thailand and Philippines Oil Palm Industries

on the 50th Anniversary of their first plantings

1969 - 2018
Contents

1- Progress over the past 50 year in Thailand & Philippines

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3- The Four Pillars of Sustainability in Thailand: the Growers’ response to the right incentives

4- Summary: Four key conclusions and our shared responsibility for the future
Thailand and Philippine Oil Palm Industries

Both regions are of similar latitude and climate, previously considered to be marginal for oil palms.
Fifty years ago:

<table>
<thead>
<tr>
<th></th>
<th>Thailand 1969</th>
<th>Philippines 1969</th>
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<tbody>
<tr>
<td>Population (million)</td>
<td>35.83</td>
<td>34.79</td>
</tr>
<tr>
<td>Economy (GDP US$ billion)</td>
<td>6.695</td>
<td>8.408</td>
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<tr>
<td>GDP per Capita US$</td>
<td>186.86</td>
<td>241.70</td>
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<tr>
<td>Life expectancy (years)</td>
<td>58.90</td>
<td>60.65</td>
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<tr>
<td>Palm Oil Production</td>
<td>zero</td>
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Fifty years later:

Planted Area since 1969 first plantings in Thailand and in Philippines

Source: DOA
Fifty years later:

**Thailand’s Production of CPO in 2018**

2,778,108 tonnes CPO

- **Biodiesel**: 44% (1,199,600 mt)
- **Domestic consumption**: 45% (1,227,000 mt)
- **Exports**: 11% (304,500 mt)

*Source: Department of Internal Trade*
Veg oil consumption has increased very rapidly from 400,000 mt in 2000 to 1.36 mil mt in 2018, forecast to rise to 1.41 mil mt in 2019 *

CNO made up 85% of consumption in 2000 but this had dropped to 12% by 2018

Imports of palm oil have risen to 1.2 mil mt *

Domestic palm oil production has failed to meet this growing demand.

* Some believe that actual consumption may be much higher, due to unreported imports of palm oil from Indonesia and Malaysia.

Thanks to Oil World  https://www.oilworld.biz
ISTA Mielke GmbH
Why has the Philippine Oil Palm Industry failed to prosper?

1) **The unintended consequences of Agrarian Land Reform:**

<table>
<thead>
<tr>
<th>Year</th>
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<th>Code</th>
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<tbody>
<tr>
<td>1988</td>
<td>Comprehensive Agrarian Land Reform Program (CARP)</td>
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<tr>
<td>1998</td>
<td>Comprehensive Agrarian Land Reform Law (CARL)</td>
<td></td>
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<tr>
<td>2009</td>
<td>Comprehensive Agrarian Reform Program Extension with Reform (CARPER)</td>
<td></td>
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</tbody>
</table>
Objectives of CARP, CARL & CARPER:

- redistribution of private and public land
- beneficiaries to be independent small farmers
- create equality for landowners in terms of income and opportunities
- empower landowner beneficiaries to have equitable ownership
- enhance agricultural production and productivities
- provide employment for more agricultural workers
- put an end to conflicts regarding land ownership
Achievements of CARP, CARL & CARPER:

2003 UN/ADB/EU study
poverty incidence amongst beneficiaries declined from 47.6% to 45.2%
“ “ amongst non participants increased from 55.1% to 56.4%
as of Dec 2013
Govt has acquired & distributed 6.9 million hectares with max allowable
3 ha to 5 ha per individual or corporation

Well intentioned Agrarian Land Reforms which restrict individual or corporate
land ownership to max 5 ha and have stifled agricultural development
One of the unintended consequences;

These school children in rural Mindanao face a difficult future.

Children of the exhausted logging industry in Agusan del Sur Province

Children of the exhausted plywood and paper-pulp factories in Surigao Province
Their forests have gone

and population pressure is ensuring that those forests will never return

But what will replace them??
Soaring populations and rural poverty are creating pressure on land and food resources

Population Growth 1969 - 2018 (millions)

Source: UN Population Estimates
worldpopulationreview.com
What else has happened over the past 50 years?

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<tr>
<td>Life expectancy (years)</td>
<td>58.90</td>
<td>75.50</td>
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<tr>
<td>Palm Oil Production (tonnes)</td>
<td>zero</td>
<td>2.8 mil</td>
</tr>
<tr>
<td>Ease of doing business (of 190 countries)</td>
<td>21st</td>
<td>95th</td>
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Despite this alarming situation some Philippine environmental and social NGOs persistently attack oil palms.

**THE PALM OIL PLAGUE HITS PALAWAN PHILIPPINES**

Despite this abundance of troubling information, the demand for palm oil continues to defy logic, with the industry expecting to grow exponentially in the coming decade.

It’s already the most widely produced vegetable oil in the world, and its inclusion on the ingredient list for candy bars, soap, biofuel, lipstick and more seems to be growing. Consequently, companies are looking for more hot, balmy climates to convert, and Palawan Philippines has come center stage.
After 50 years of largely fruitless effort the Philippines oil palm industry is struggling to produce barely 10% of the country’s soaring edible oil requirements.

In 2019, it will cost the Philippines approximately one billion USD to import palm oil which could and should be produced by its own farmers.

Why is it different in Thailand?
Three Key features of Thailand’s Oil Palm Industry

1- Small farmers owning less than 8 ha (50 rai) comprise more than 90% of the 1.0 mil planted hectares.

2- More than 300,000 small farmers and their families are now supported by oil palms.

3- Smallholder farms are being converted from existing crops. *eg. from rubber, coconuts, cattle grazing.*

No deforestation to plant oil palms in Thailand
Policies which have made the difference

1- Less industry regulation
   Notwithstanding the region’s most stringent environmental standards

2- Government encouragement of qualified Investors
   Land concessions up to 3,000 ha offered to a small number of qualified nucleus investors

3- Policies to encourage small farmers
   Protection from imports, encouragement of nucleus developers, access to rural finance
Thailand Growers’ Response

Four Pillars of Sustainable Palm Oil Production in Thailand

1. Advances in Science
2. Environmental Best Practice
3. Development of sustainable markets
4. Social Sustainability
Private sector oil palm breeding for Drought Tolerance

Collection of genetic material from leading overseas programmes

Unilever & SIPEF
1968 Joint Research Scheme (JRS)
Binga (Congo)
Yangambi and other origins

Combined Breeding Programme (CBP)
1988 - 1991

Dami (Papua New Guinea)
(Harrison & Crosfield)
Deli Duras and AVROS

Lobe (Cameroon)
(Unilever)
Ekona and others

Chemara (Malaysia)
(Guthries)
Deli Duras, 1970

Unifield PLC (UK)
Clones of selected Duras, Teneras and Pisiferas
1991

Oil Palm Research Centre
OPRC
Thailand

Yaligimba (Congo)
(Unilever)
Deli Duras, ex-Dami and others, 1997
Oil palm breeding for Drought Tolerance

Controlled pollination of selected mother palms

Testing more than 1,000 hybrid crosses for 5 years of yield records
Producing new generations of higher yielding palms

Seeds selected for drought tolerance and higher yields in Thailand’s dry climate
Improvement over Generations

Commercial yield profiles (non-irrigated commercial blocks)

Total Fruit Yield to year 7 from planting

1975 plantings = 46.7 t/ha
1985 plantings = 58.3 t/ha
1995 plantings = 71.9 t/ha
2005 plantings = 89.6 t/ha
Advances in Science

Now exported to growers around the world

Thailand’s drought tolerant seeds are exported to growers in more than 15 countries

Increasing economic sustainability in dry climates
Supplying local farmers with millions of drought tolerant seedlings

Also supplied to Thailand’s small farmers as premium seedlings

Increasing economic sustainability for Thailand’s growers
New technology for Thailand’s latest advance in oil palm breeding
Thailand’s oil palm clones

Cloning elite palms from the breeding programmes
Cloned elite mother palms are now producing clonal seeds

Increasing economic sustainability for Thailand’s growers and overseas customers
Genomics Laboratory to support Thailand’s oil palm breeding for DNA ‘finger-printing’ and tracing of genetic markers
Developing new techniques for replanting old palms

Avenue underplanting with phased felling of the old palms
Avenue Replanting

Underplanting spreads the economic cost of replanting and optimises the use of biomass nutrients from the old stand of palms.

*Improving environmental & economic sustainability*
Maximising Oil Palm Yield by High Density Planting and Thinning

PALAT, T, CHAYAWAT, N
Univanich Palm Oil Public Co Ltd, P O Box 8-9, Aoluk, Krabi 81110, Thailand

AND

CORLEY, R H V
Highlands, New Road, Great Barford, Bedford, United Kingdom

Optimal planting density for current yield is much higher in young oil palm than in palms over 10 years old. High density planting followed by thinning allows early yields to be increased, while avoiding the loss from excessive inter-palm competition in later years. At Univanich Palm Oil PCL in Southern Thailand, the trial described here confirmed that, for cumulative yield over the life of a planting, the optimum is about 145 palms per hectare. The optimal density for current yield decreased with age, reaching a minimum 11-12 years after field planting, but then increased slightly in year 13. With initial planting at 160 or 180 palms per hectare, followed by 25 per cent or 33 per cent thinning to leave 120 palms per hectare, results up to 16 years after planting gave cumulative yields at least 15 per cent higher, or up to 36 tonnes FFB per hectare more, than a fixed density of 143 palms per hectare, provided that thinning was done at year 8-9 after planting to benefit from the period of low optimal density in years 11-12.
MAXIMISING LIFETIME YIELD FOR GREATER ECONOMIC SUSTAINABILITY

Corley, R.H.V. ² and Palat, T.¹

¹ Univanich Palm Oil Public Company Ltd, Aoluk, Krabi, Thailand
² Highlands, New Road, Great Barford, Bedford, UK

ABSTRACT

To ensure economic and environmental sustainability, yield must be maximised over the entire life of an oil palm plantation. Much work has been done on breeding for higher yield, and on optimising fertiliser inputs. In this paper we review some other important factors studied in trials carried out by Univanich Palm Oil PCL in Thailand, including choice of planting density and replanting methods, and, for drier climates, irrigation and breeding for drought tolerance.

Planting at 160 palms/ha with later thinning by 25% gave 18% greater yield over 18 years than planting at 143/ha without thinning, provided that thinning was done in year 8. If thinning was delayed until year 12, the yield increase was negligible.

In a comparison of irrigation methods, drip irrigation proved the best. With a mean annual water deficit of around 290 mm, drip irrigation at 450 litres/palm per day gave an average yield increase of 10 t FFB/ha.yr from mature palms. There are large differences between Dxp progenies in response to drought, with yield reductions ranging from zero to 50%. Planting drought tolerant material will help to increase yields where a regular dry season occurs, and irrigation is not possible.

Yield loss at replanting can be reduced by underplanting. In commercial practice this gave 36% more FFB compared to clear felling over the first 5 years after replanting, with little difference thereafter. Thinning and replanting 50% of the stand at 10 years, while retaining the other 50% in a two-tier canopy, gave 9% greater yield over 18 years than a standard planting. Either method allows the possibility of continuous production, and recycling of biomass nutrients after felling of the old stand should be more efficient, reducing the need for conventional fertilisers.
Second Pillar
of Sustainable Palm Oil Production in Thailand

1. Advances in Science
2. Environmental Best Practice
Returning biomass to the field

Reducing the need for chemical fertilisers
EFB compost for use in oil palm nurseries

*Increasing economic & environmental sustainability*
Introducing barn owls to Thailand’s plantations

Each barn owl family consumes 3 rats per day.

Improving economic & environmental sustainability
Thailand’s small farmers are adopting more environmental friendly Barn Owls to help control rats in their family farms.
Palm oil mill effluent (POME) is normally treated in deep anaerobic ponds which do not contain toxic materials but emit methane biogas during anaerobic treatment.

Traditional effluent treatment ponds: A source of potent greenhouse gas emissions.
Construction of Biogas Reactors to capture the methane

First Project
2006/2007 - Siam Project

Second Project
2007- Lamthap Project
Environmental Sustainability

Capturing the Green House Gases

Completed Biogas CIGARS (Covered In-Ground Anaerobic Reactors)

– Siam Project

– Siam
Commissioned December 2007

– Lamthap
Commissioned June 2008
Capturing the Green House Gases

Topi Project
Commissioned
August 2009

Capturing the methane biogas as a renewable fuel
Gas engine generators fueled by methane biogas now supply electricity to Thailand’s national grid. Surplus Methane is burnt in flares to also qualify for Certified Emissions Reductions (CERs).
Environmental Sustainability

**Supplying Renewable Energy to the National Grid**

The sustainability objectives have been achieved

- large reduction in greenhouse gas emissions
- renewable energy source has replaced fossil fuels
- waste water treatment has improved
- factory efficiencies have improved
- new skilled jobs have been created in three rural communities

*Increasing economic, environmental and social sustainability*
Third Pillar
of Sustainable Palm Oil Production in Thailand

1. Advances in Science
2. Environmental Best Practice
3. Development of sustainable markets
Thailand’s first export of Certified Sustainable Palm Oil (CSPO) in 2013 to premium markets in Germany

Promoting economic sustainability for Thailand’s small growers
Laemphong Jetty and Tank Farm
Thailand’s west coast port for palm oil exports to India or Europe
Fourth Pillar

of Sustainable Palm Oil Production in Thailand

1. Advances in Science
2. Environmental Best Practice
3. Development of sustainable markets
4. Social Sustainability
Social Sustainability
Sharing the technology and spreading the prosperity

Farmer Field Days
More than 1,000 small-holder farmers attending an oil palm field day

*Sharing the technology and spreading the prosperity*
Sharing results of fertiliser trials with local farmers
帮助农民提高经济和环境可持续性

学习中心为小农户农民
Social Sustainability

The first independent small farmers to be RSPO Certified in 2012
RSPO’s first independent smallholders to be certified

In 2012 Thailand’s smallholders receive the award in Singapore
Social Sustainability

Thailand companies have also developed skilled and stable workforces

5S, ISO, RSPO programmes for clean & safe workplaces

Quality housing for plantation workers & their families

Promoting economic and social sustainability
New Ambulance for Aoluk Hospital

Portable Oxygen Generators for Aoluk Hospital

Community Hall at Plaipraya School

New Dental Clinic for Plaipraya Hospital

Promoting Thailand’s economic and social sustainability
Social Sustainability

In conclusion:
Thailand’s oil palm industry has brought dramatic improvement to previously impoverished rural communities

A new prosperity for many thousands of rural families
But looking 30 years ahead;

Soaring global populations and rural poverty are creating pressure on land and food resources.

Population Forecasts to 2050 (millions)

Source: UN Population Estimates

[Graph showing population forecasts for Thailand and Philippines from 1970 to 2050, with population estimates for 2020 and 2050 for Thailand at 65.3 million and 151.2 million respectively.]

WorldPopulationReview.com
Looking to the future

Summary: Four key conclusions and our shared responsibility for the future

1- As we have seen in Thailand
Given the right incentives small farmers are able to develop a very sustainable industry.

2- The unintended consequences of well-intended social policies can be a barrier to oil palm development. This will have serious consequences for many societies and for the global environment.

3- As we can see from population trends, not just in Philippines, but globally, the soaring demand for vegetable oils does not “defy logic”

4- We have a shared responsibility to address the reasons for the current global slowdown in new oil palm plantings before that slowdown results in more serious social and environmental problems.
Thank you for your attention