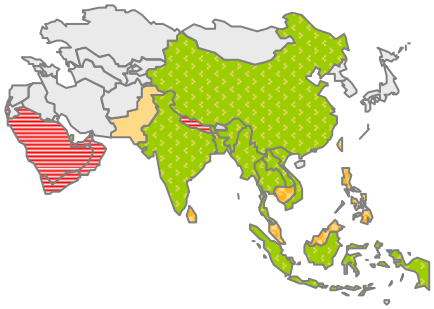
Global Market Study on Jatropha

Project Inventory: Asia



Prepared for the World Wide Fund for Nature (WWF)

London / Berlin, May 8th, 2008

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General observations

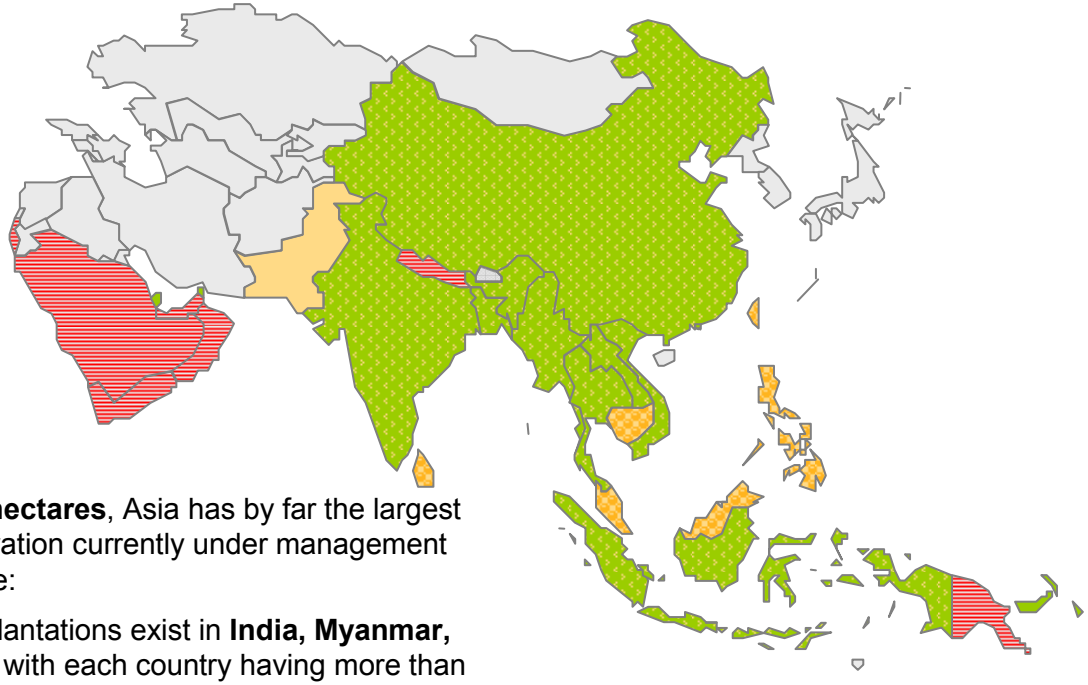
Scale of cultivation:

2008: **910,000 ha***

2015: **9.2 million ha****

Number of projects identified: 104

** Projects identified*
***Expert Country Estimates*



With more than **900,000 hectares**, Asia has by far the largest acreage of Jatropha cultivation currently under management worldwide. Key finding are:

- The largest Jatropha plantations exist in **India, Myanmar, China** and **Indonesia**, with each country having more than 50,000 ha under cultivation today.
- The greatest projects are **government initiated**; they include pro-poor support schemes in India to rehabilitate waste lands, village programs in Lao and Myanmar as well as plantations developed by the largest national oil companies in China.
- It is expected that large investments will take place in the future; the total acreage will increase according to experts' estimates up to **9.2 million hectares** in the next 7 years.

Strong commercial activities (> 5,000 ha, increasing)

Raising commercial activities (100-5,000 ha, increasing)

Low commercial activities (< 100 ha, just starting)

No commercial activities reported

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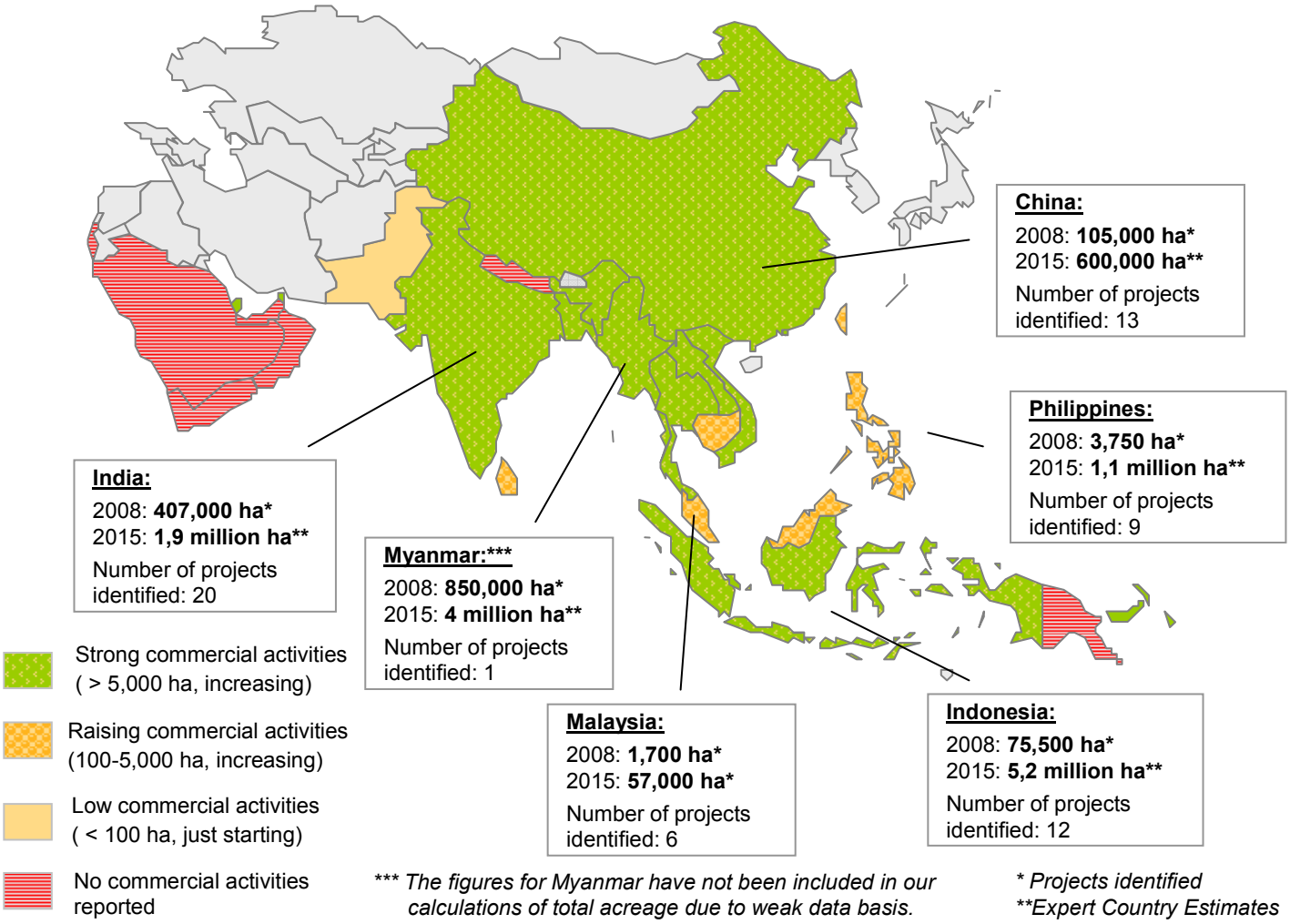
1 Regional Overview

Total acreage of selected countries (2008, 2015)

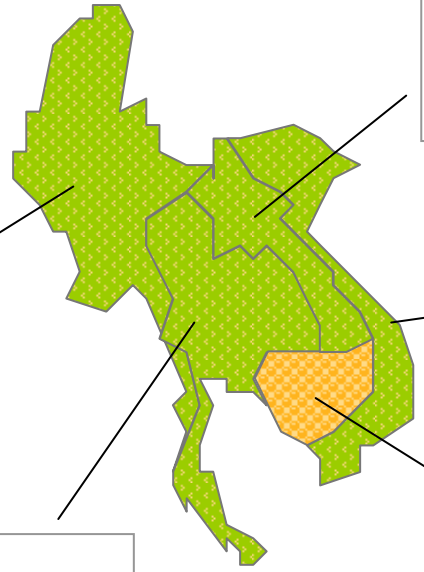


**** The figures for Myanmar have not been included in our calculations of total acreage due to weak data basis.*

** Projects identified*
***Expert Country Estimates*

Total acreage of selected countries (2008, 2015)

Greater Mekong Region



Lao:
2008: **11,700 ha***
2015: **100,000 ha****
Number of projects identified: 13

Myanmar:
2008: **850,000 ha***
2015: **4 million ha****
Number of projects identified: 1

Vietnam:
2008: **10,000 ha***
2015: **300,000 ha****
Number of projects identified: 3

Cambodia:
2008: **not applicable*****
2015: **107,000 ha****
Number of projects identified: 13

Thailand:
2008: **20,000 ha***
2015: **150,000 ha****
Number of projects identified: 4

Strong commercial activities (> 5,000 ha, increasing)

Low commercial activities (< 100 ha, just starting)

Raising commercial activities (100-5,000 ha, increasing)

No commercial activities reported

* *Projects identified*
** *Expert Country Estimates*
*** *The country experts estimates and the reported project data differ widely. Further clarification is needed.*

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2 Indian Sub-Continent

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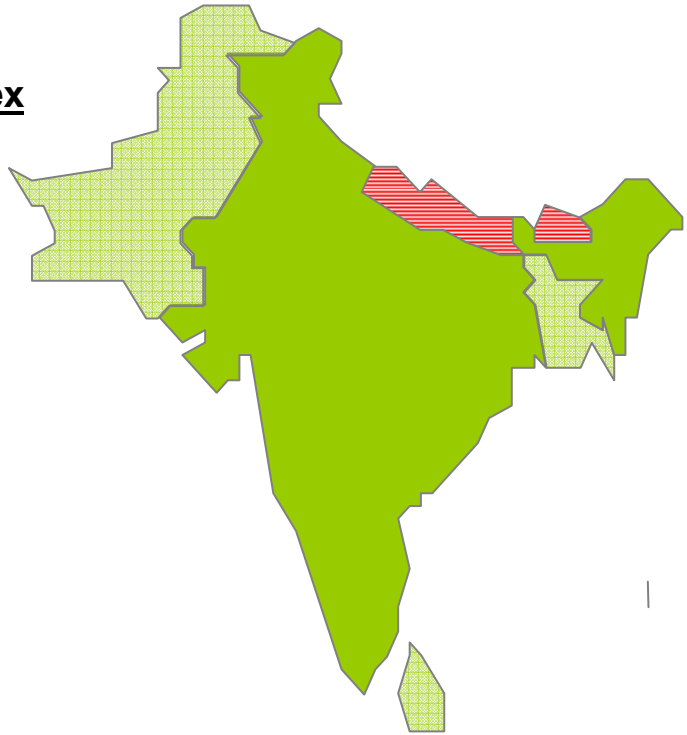
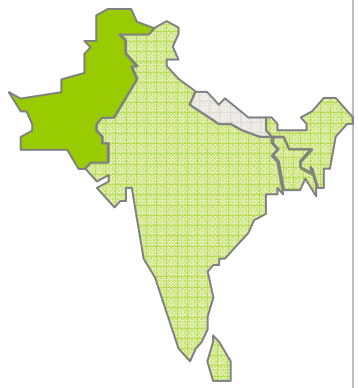
Pakistan
India
Sri Lanka



country profile chart
country in brief chart
no chart

2 Indian Sub-Continent – Pakistan



Pakistan

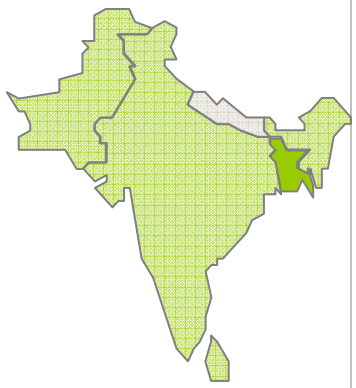
☐ Jatropha exists ☐ Jatropha locally used ☐ Commercially farmed

Policies:

No Jatropha-specific program or legislation exists in Pakistan at present. The Government introduced the "Alternative Energy Development Board" (AEDB) in 2003. The main objective of the Board is to promote and encourage the development of renewable energy. The target mentioned is a 10% share of renewable energy in the overall energy mix of Pakistan. Foreign investment is said to be encouraged.

Additionally, a Biofuel task force has been reported to investigate the potential for the production of biofuel from biomass.

Projects: No direct contact could be established to a Jatropha project in Pakistan to confirm information from public sources. These mention a project plan for cultivating 16,000 ha with Jatropha. Jatropha nurseries are reportedly to be set up.



Bangladesh

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Jatropha curcas, which is known as kala arenda in Bangladesh was brought to Asia by the Portuguese.

Policies: At present, no Jatropha-specific legislation or support program exists in Bangladesh. The government reportedly announced in mid 2006 the plan to promote cultivation of Jatropha for the production of biodiesel in order to reduce the country's dependence on imported petroleum fuels. An inter-ministerial meeting on the prospect of Jatropha cultivation was held, chaired by the national advisor for Energy and Mineral Resources.

Policies: Few projects were identified through public sources, but could not be confirmed otherwise.

The Indian company Biodiesel Technologies has apparently set up a 8,000 ha Jatropha project, which includes production of plant oil.

Public sources from 2007 mention that a 710 ha plantation of Jatropha has been set up by James Finlay Tea company on unused and fallow land. The aim of the project is to produce biodiesel. The setting up of the plantation apparently followed a small pilot cultivation of Jatropha which gave promising results.

Further tea estates in the greater Sylhet region reportedly launched the commercial cultivation of Jatropha Curcas – also on unused land.

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2 Indian Sub-Continent – India

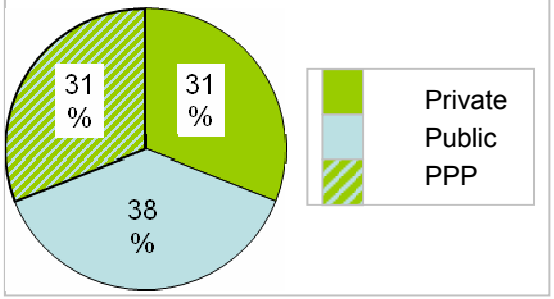
Summary & Comments

India is a first-mover with regard to actively farming Jatropha as feedstock for biofuel production. It is estimated that almost half a million hectares have been planted. The first governmental policies on Jatropha were introduced as early as 2003. Today, Jatropha production is supported by almost all Indian State Governments through guaranteed purchasing schemes. Their aim is to integrate the rural poor into the biofuel value chain while rehabilitating waste lands. Major research programs on Jatropha are located in India. India has been targeted by major international biofuel corporations for investments in Jatropha plantations.

Scale of Jatropha Cultivation

	Expert Estimate	Projects identified
current	497,881 ha	407,635 ha
2010	1,179,760 ha	1,455,363 ha
2015	1,861,833 ha	5,479,765 ha

Project Ownership



Government Programs Biofuel Legislation

The Indian government is currently devising a biofuel policy draft, targeting a 5% biodiesel blend by 2012 (and 10% by 2017). In January 2006 public sector oil companies announced that they would pay a guaranteed purchase price of 25 Rupees (US$ 0.56) per liter to biodiesel producers. A Biodiesel Credit Bank will coordinate activities relating to Carbon Credits of biofuel projects. In addition, the Indian government offers biofuel producers tax exemptions or reductions, for example on VAT and sales tax.

Government Policy on Jatropha

The Indian Government targeted 400,000 ha for the demonstration phase in 2006/07 and is aiming to have planted 11.2 million ha with Jatropha by 2012. Support mechanisms under the National Employment Guarantee Schemes include Comprehensive Land Development Program (CLDP); Drought Prone Area Program (DPAP); Watershed Development Fund (WDF), and National Food for Work Programme (NFWP)

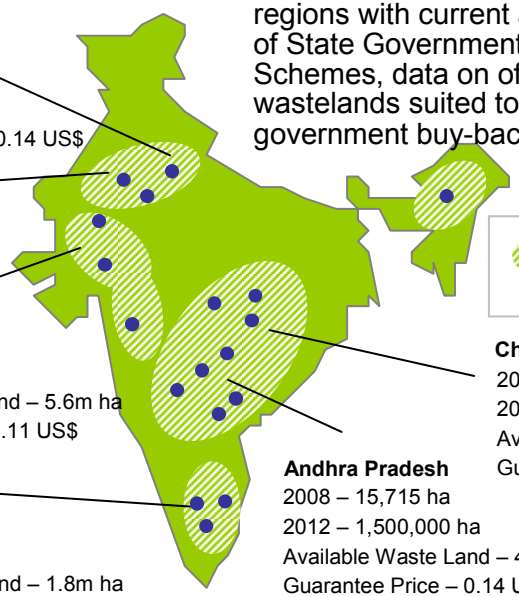
NGO-Initiatives

There are many NGOs working at a local & national level.

2 Indian Sub-Continent – India

Regional Distribution

This diagram represents selected regions with current and future targets of State Governmental Jatropha Schemes, data on official estimates of wastelands suited to Jatropha, and government buy-back schemes.



Uttaranchal
2008 – 350 ha
2012 – 200,000 ha
Guarantee Price – 0.14 US$

Haryana
2008 – 328 ha
2012 – 20,000 ha

Rajasthan
2008 – 33,000 ha
2012 – 220,000 ha
Available Waste Land – 5.6m ha
Guarantee Price - 0.11 US$

Tamil Nadu
2008 – 20,277 ha
2012 – 100,000
Available Waste Land – 1.8m ha
Guarantee Price - 0.12 US$

Andhra Pradesh
2008 – 15,715 ha
2012 – 1,500,000 ha
Available Waste Land – 4.4m ha
Guarantee Price – 0.14 US$

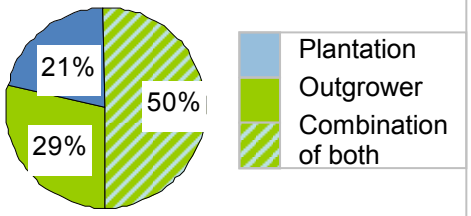
Chhattisgar
2008 – 84,000 ha
2012 – 1,000,000 ha
Available Waste Land: 1m ha
Guarantee Price – 0.13 US$

Most suitable areas
Selected projects

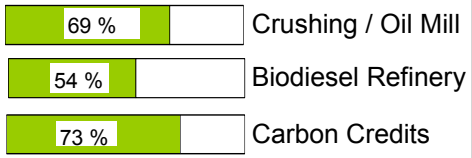
Project Evaluation

- According to data received, 60% of the projects cultivate Jatropha partially or totally on waste lands not suitable for agricultural production. 92% of the projects include outgrower schemes.
- Country experts suggest that either no or manual irrigation is used. However, more than 60% of the projects report some use of irrigation.
- The government pursues a policy of guaranteed prices. However, the projects analysed usually sold seeds at higher prices. The seeds were sold to research projects or nurseries.
- In a 5 year forecast, experts see a continued high importance of wild seed collection and of small-scale research or farming operations of less than 5 ha (75% of total anticipated production).

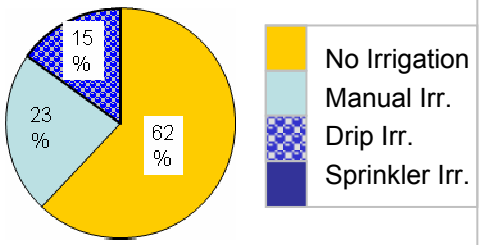
Plantation Model



Value Chain Elements



Irrigation Models



Prices

Seeds (per kg /dry)	**0.22 US$**
Labour (per day)	**2.23 US$**
Diesel at pump	**0.88 US$**

17 experts interviewed
25 projects analysed

2 Indian Sub-Continent – India

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
D1-BP Fuel Crops & Williamson Magor	1		North East India	62,455	
D1-BP Fuel Crops	1		South India	5,922	
D1-BP Fuel Crops	1		(other regions)	26,693	
Andhra Pradesh State	3		In 8 Districts, Andhra Pradesh	15,715	1,500,000
Mission Biofuels	1		Tamil Nadu, Karnataka, Maharashtra, Andhra Pradesh and Orissa	40,000	260,000
NOVOD – ICRISAT	1		District of Ranga Reddy, Andhra Pradesh	400	
ICRISAT – RSAD	1		Districts Medak and Kurnool, Andhra Pradesh	200	
Southern Online Biotechnologies (SBT) – ICRISAT – GTZ	1		District of Nalgonda, Andhra Pradesh	25	
BP – TERI	3		Andhra Pradesh and Chhattisgarh		8,000
Naturol Bioenergy Ltd	1		Andhra Pradesh	1,000	100,000
Land Lab Bio-tech	1		Karnatak	2,000	25,000
Dr. MGR Jatropha bio-diesel Project, Tamil Nadu	1		Village of Sattur, Tamil Nadu		4,000

1 Interview / Questionnaire with project representative
2 Interview / Questionnaire with external project expert
3 Public sources

Commercial project
Non-commercial project

2 Indian Sub-Continent – India

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
Pandian Estates Private Limited	1		District of Madurai, Tamil Nadu	50	165
V. Bakthavatchalam	3		District of Coimbatore, Tamil Nadu	168	
Green Oil Energy Sciences Private Limited	1		Not known	50	10,000
State Uttaranchal Biofuels Board	3		Uttaranchal	350	200,000
State Government Haryana	3		Haryana	328	20,000
Chhattisgarh Bio-Fuel Development Authority	3		Chhattisgarh	84,000	1,000,000
Society for Rural Initiatives for Promotion of Herbals	3		Rajasthan	33,000	220,000
Indian Oil Corporation (Gujart)	3		Gujarat	80	
Noble Horticulture Farm	3		Maharashtra	120	610
Department of Biotechnology of India	2		New Delhi	200	

Acreage non-disclosed projects	134,879	2,001,073
Total	**407,635**	**5,479,765**

Commercial project

Non-commercial project

1 Interview / Questionnaire with project representative

2 Interview / Questionnaire with external project expert

3 Public sources

Sri Lanka

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: A Jaropha-specific legislation or government program does not exist at present. However, the Government of Sri Lanka is currently studying the feasibility of cultivating Jatropha on marginal state land in order to produce bio-diesel, according to public sources. Jatropha is said to be recognised as a most efficient source of biodiesel.

The Strategic Enterprise Management Agency (SEMA) is reportedly trying to identify about 10,000 ha of unused land suitable for Jatropha cultivation, for instance unproductive plantation lands. Officials mention land in the north of Puttalam and in the Mannar basin as well as in the eastern province. SEMA is looking for partnerships with the private sector for project development.

Projects: Very few projects or project plans have been identified in Sri Lanka, mainly private, profit-oriented undertakings working in cooperation with local farmers or small local companies. Plans for a medium to large-scale project on an unused plantation have been reported by an international investor company.

In 2003, a two-year research project with focus on income generation for rural women's groups was conducted in T´wila, in the south of Sri Lanka.

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3 Mekong Region

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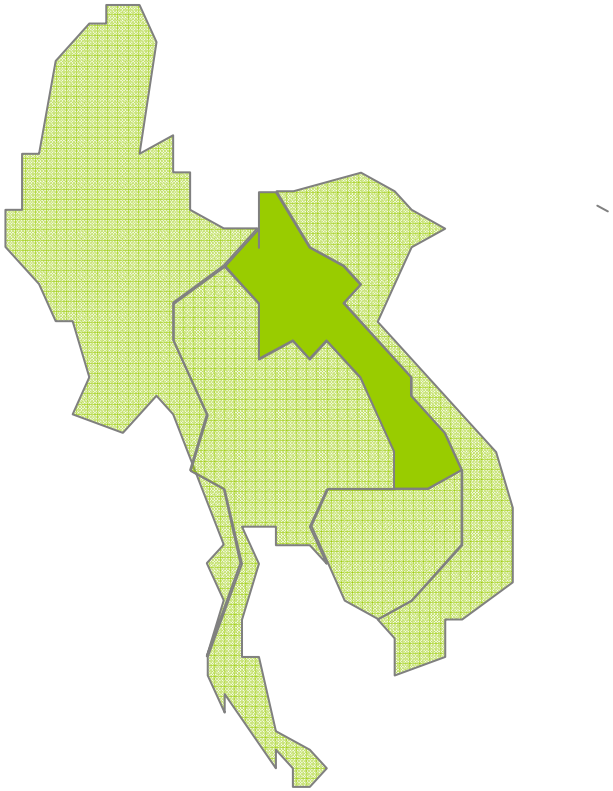
Lao

Cambodia

Vietnam

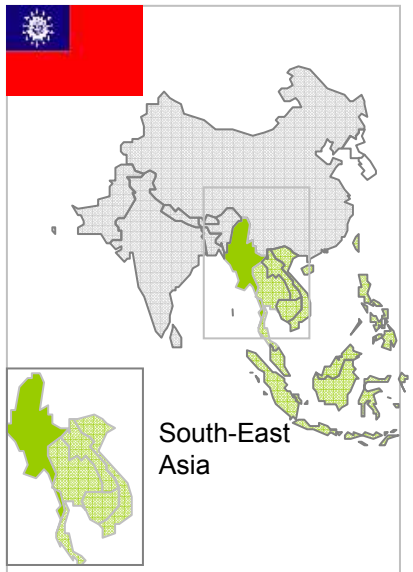


country profile chart

country in brief chart

no chart

3 Mekong Region – Myanmar



Myanmar

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: The military regime in Myanmar pursues ambitious and aggressive plans to make use of Jatropha to decrease the dependence on foreign imports of oil. The Jatropha program has been initiated by the Myanmar Ministry of Agriculture and Irrigation in 2005. It is reported that a total acreage of 850,000 ha is currently planted by local villagers throughout the country.

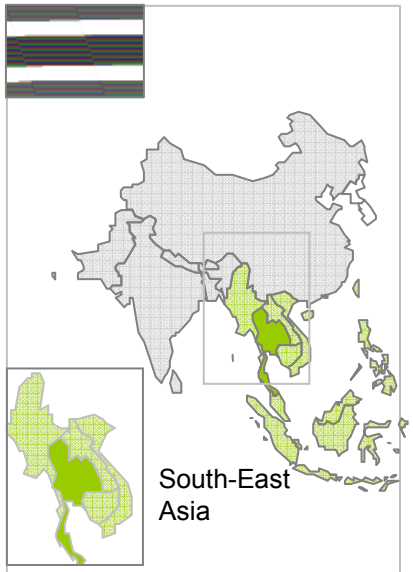
The Ministry has announced plans to increase biofuel processing capacity in 2008, and to expand Jatropha cultivation to over three million hectares. The target for 2010 is 4 million hectares. According to public officials, Myanmar has about 6.41 million hectares of land suitable for growing Jatropha.

Projects: Field missions from FAO and other agencies reported that the quality of plantations which have been seen, were very poor. Apparently, due to a lack of agronomic expertise, the cultivation of Jatropha has been enforced by the military regime also in regions not suited for Jatropha.

A 2008 report by the Ethnic Community Development Forum shows the devastating effects of this initiative. The report can be downloaded under: http://www.terraper.org/file_upload/BiofuelbyDecree.pdf

Market: Domestic energy and transport sector.

3 Mekong Region – Thailand



Thailand

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: Biodiesel is still an emerging sector in Thailand, but is reported to grow rapidly. The Thai government reportedly is very supportive of and optimistic about the potential of biofuels for Thailand. It is currently implementing a land zoning support scheme.

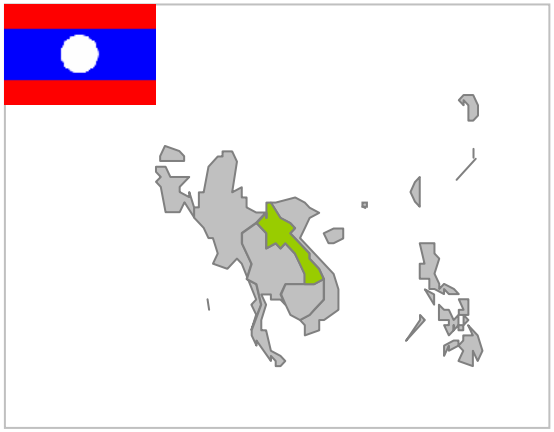
A legislation has been passed to phase in B10 (10 % Biodiesel in diesel) on a nationwide basis by 2011. A National Biofuel Committee has been established to provide financial and other support to local farmers. This will be done via a network of universities and various ministries including Ministry of Finance, Agriculture, Energy, Industry and Science & Technology. Grants have been offered to research institutions for the in-depth study of all aspects concerning Jatropha cultivation.

The Ministry of Energy has set a target of 150,000 ha of Jatropha cultivation for 2012. Also, a biodiesel production capacity of 8.5 million liters/ per day is targeted for 2012.

Projects: Currently, projects with a total acreage of 19,878 ha have been identified. The major players include Bioenergy Development Co. Ltd. and Equitech. About two thirds of the identified projects are private projects.

Market: Domestic biodiesel refinery and biogas from press cake.

3 Mekong Region – Lao



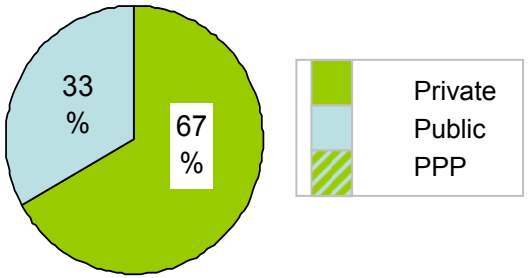
Summary & Comments

Jatropha grows in almost any region in Lao and is commonly used as hedges in villages. It has been identified by the government as the plant with the highest potential for biodiesel. With only 48% of the population having access to electricity, Jatropha is expected to further effective and affordable electricity generation in rural areas. A cohesive national policy on bio-fuels has yet to be developed. However, government policies and regulations already point at the promotion of biofuel crops.
Concern has been expressed by country experts that with an increasing investment in Jatropha projects in Lao, “slash and burn” agriculture may become more frequent.

Scale of Jatropha Cultivation

	Expert Estimate	Projects identified
current	8,190 ha	11,751 ha
2010	35,000 ha	45,381ha
2015	100,000 ha	105,411 ha

Project Ownership



Government Programs

Jatropha / Biofuel Legislation
At present, Lao PDR does not have any specific decrees or regulations to manage the production and use of biofuel. However, many government policies and regulations promote the production of alternative fuels such as biodiesel and ethanol.

The Ministry of Energy (MEM) drafted a policy for the promotion of biofuel production in Lao which address goals, targets, issues and strategic objectives. It has not become an official policy yet.

Government Targets on Jatropha
The draft policy by MEM – which is yet be approved – suggests a 5%-share of biofuels in total fuel consumption to be achieved by 2015. Fossil fuel consumption is to be reduced by 5% from 2010 onwards.

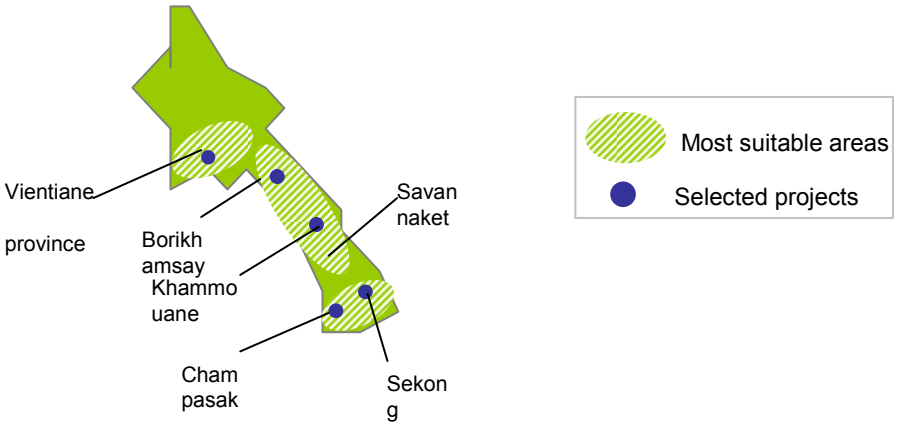
Barriers for Jatropha investments
Land availability for large scale plantations for many companies.

NGO-Initiatives
NUOL, LPOPA, AAHP, TPLPA,SNV, VECO, Triangle, CIDSE

3 Mekong Region – Lao

Regional Distribution

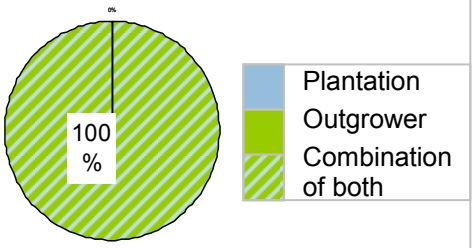
Jatropha is reported to grow well in the central and southern regions of Lao. The main cultivation area includes Vientiane Province, Xieng Khouan Province, Borikhamsay Province, Khammouane Province and Savannaket Province in central Lao, as well as the Champasak province and Sekong Province in the south.



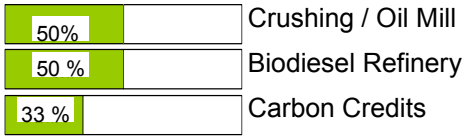
Project Evaluation

- Intercropping and pruning are the most widely used cultivation techniques. According to country experts, one third of projects apply irrigation, root cutting and fertilisation.
- Half of the projects identified report that they aim to set up their own oil milling facilities and biodiesel refinery.
- Carbon credits play a less important role. Only one project states that it targets CDM credits under the UNFCCC scheme.
- The majority of projects identified are developed on wasteland.
- Sustainability policies are not frequently mentioned by project owners.

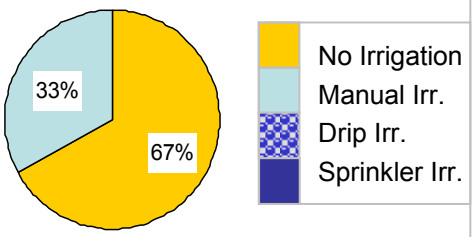
Plantation Model



Value Chain Elements



Irrigation Models



Prices

Seeds (per kg /dry)	**$0.58-1.16**
Labour (per day)	**$2.31-3.47**
Diesel at pump	**$0.81-1.21**

8 experts interviewed
13 projects analysed

3 Mekong Region – Lao

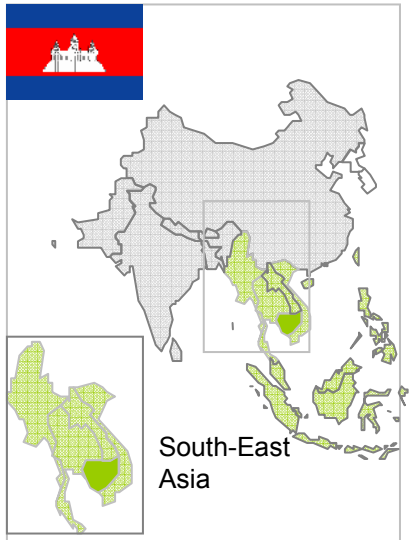
Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
Lao Institute for Renewable Energy (LIRE)	1		Wat Nark Village, Vientiane Province	10	50
Rivertime Plantations	1			0*	---
FRC/TAISEI Japan	3		Nakhanthoung V. Saythany D.	10	---
Kolao Group	1		Nathe Village, Saythany, Dong Village	2,106	---
AEC/French Company	1		Namhum V. Nasaithong D.	150	---
Mrs. Deth Saysompheng/ Mr. Chamlong	1		Huaila V. Sangthong D.	50	---
Mr. Khamsing Sihathep	1		Nasaithong D.	150	---
J and P Company	3		Sayabury	1,200	---
Y and P Company	3		Bolikhamsay	112	---
Italian Group	3		Bolikhamsay	100	---
Champassak	3		Champassak	1,400	---
Equitech (LAO) Co. Ltd.	1			6,380	10,000
Mr Kavin/Mr. Khampha	1		Pakngum and Kasy	83	---

Non-commercial Commercial

1 Interview / Questionnaire with project representative
2 Interview / Questionnaire with external project expert
3 Public sources

Acreage non-disclosed projects	---	95,361
Total	**11,751**	**105,411**

3 Mekong Region – Cambodia



Cambodia

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: The Royal Government of Cambodia (RGC) reportedly has not undertaken any significant steps to stimulate or promote the cultivation of biofuel crops or the production of biodiesel.

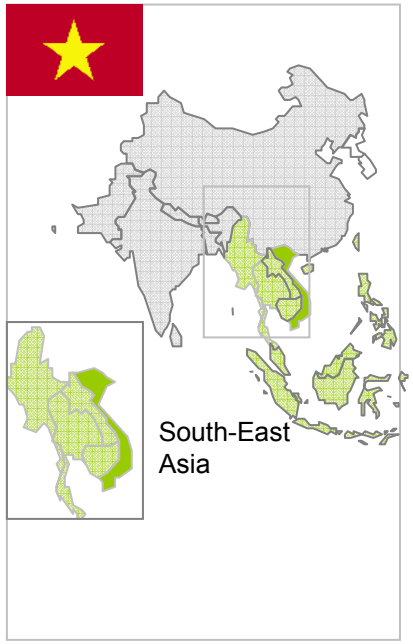
However, RGC has launched a series of discussions to address the development of renewable sources of energy. Currently the underlining government policy of promoting alternative renewable energy is linked with the strategy for poverty reduction. The major objective is to promote electrification of and energy supply for rural areas.

Some country experts believe that a guaranteed market and price for Jatropha products would serve as a useful incentive for the cultivation of Jatropha and the establishment of biodiesel production facilities.

Projects: A significant number of private foreign investors has been identified, that aim at establishing large-scale Jatropha plantations. These are mainly from Singapore, South Korea, Malaysia, Japan and Thailand. Reportedly, these already have 160,000 ha under cultivation, a number which could not be confirmed and have been questioned by the country experts we have interviewed. Project owners and investors state an ambitious target of ~500,000 ha of Jatropha to be cultivated in total by 2015.

Market: The main market reported to be targeted is the domestic and international biodiesel market.

3 Mekong Region – Vietnam



Vietnam

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: Vietnam's policy towards biomass energy apparently does not place the focus on domestic development and production of biofuels. So far, country experts are not aware of a specific governmental unit that is responsible for the biofuel sector. Some companies have reported long waiting times (several months) for governmental approval of their biomass products.

Projects: HCM City-based Institute for Tropical Biology undertook a pilot research project on Jatropha. The identified acreage of jatropha in Vietnam is currently 10,000 ha. Major players are Jatoil and Mang Den Sai gon Joint Stock Company. Eco-Carbone has stated plans to set up a partnership scheme with local farmers and communities to cultivate a minimum of 30,000 ha with Jatropha.

Content

1 Regional Overview

2 Indian Sub-Continent

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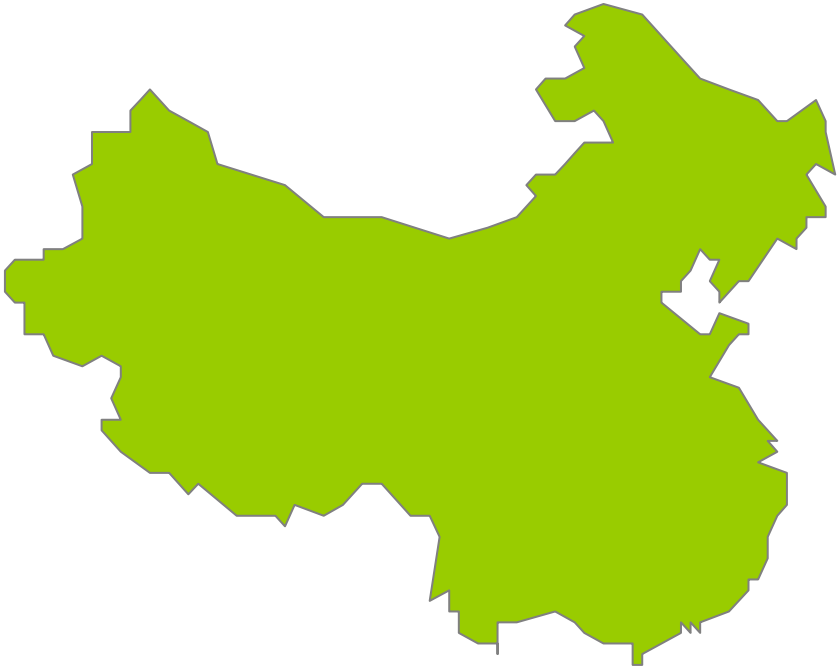
4 China

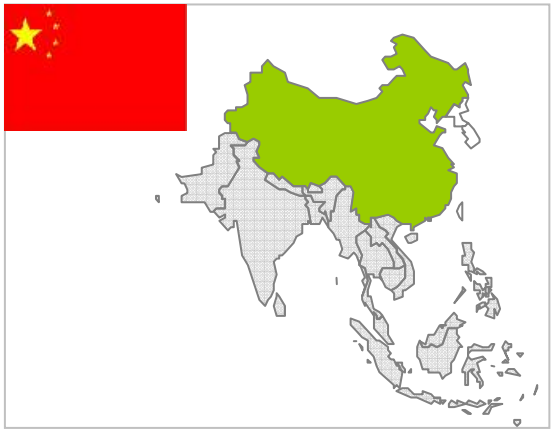


country profile chart

country in brief chart

no chart

4 China



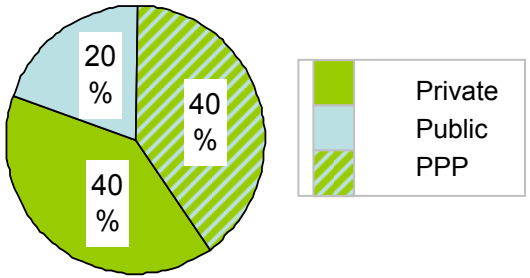
Summary & Comments

China is one of the world's leading biofuel producers. Especially Jatropha has become an important biofuel crop in recent years – mainly as climatic conditions in the southwest of China are favourable and labour is available at low cost. Some of the leading oil companies such the Chinese state-owned oil company CNOOC have invested into Jatropha projects. The government has highlighted the importance of biofuel production in legislation and policies. Relevant policies and subsidies specifically for Jatropha are expected for the coming years.

Scale of Jatropha Cultivation

	Expert Estimate	Projects identified
current	229,980 ha	105,251 ha
2010	456,260 ha	161,651ha
2015	597,260 ha	706,604 ha

Project Ownership



Government Programs

Jatropha / Biofuel Legislation
The government actively encourages the cultivation of biodiesel crops through the Chinese Renewable Energy Development Group. Supportive policies include tax reduction, loss and raw material subsidy as well as demonstration projects. However, Jatropha is not highlighted in the legislation.

Other means of support
The government identified suitable areas for Jatropha cultivation in an industry development seminar in November 2006 in Beijing. The Forest Ministry will provide financial and technological support.

Government Targets
The government has set a target for biofuel production capacities of 1,24 million tonnes to be achieved by 2010.

Barriers for Jatropha investments
Lack of integrated value chain limits the development of the Jatropha industry. Large scale land availability is expected to become an issue.

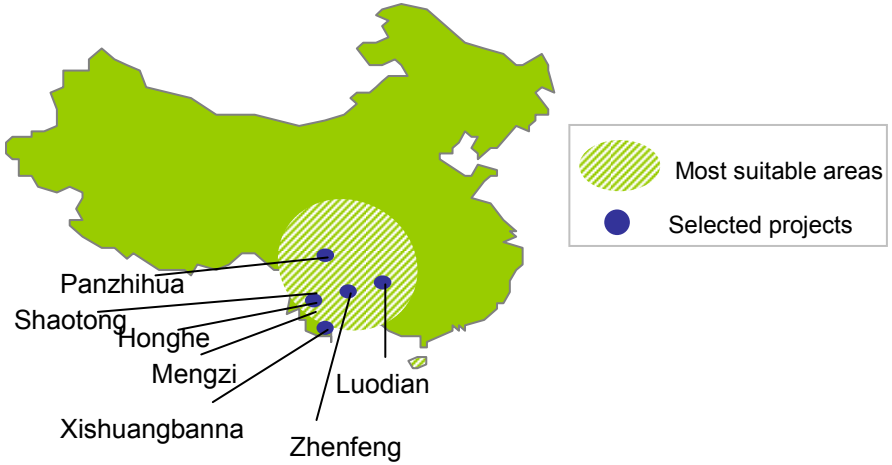
NGO-Initiatives
Country expert mention Sichuan University, Guizhou University, Chinese Academy of Science and UNDP.

4 China

Regional Distribution

The south-western regions of China are reported to be most suitable for Jatropha due to their advantageous climate.

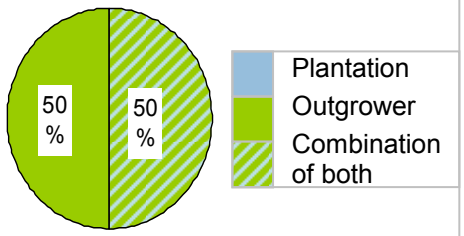
Most Jatropha projects are found in the provincs Sichuan, Yunnan and Guizhou.



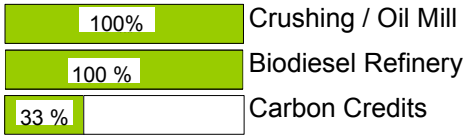
Project Evaluation

- The vast majority of projects are commercial undertakings (~90 %) with a private (40%) or PPP (40%) background.
- The major part of projects report the use of pruning and fertilisation. If irrigation is used, country experts report mainly drip and to a far lesser extent sprinkler irrigation schemes.
- Most of the projects aim to set up their own oil milling facilities and biodiesel refineries. Carbon credits apparently are less important.
- Sustainability policies are reported to exist for most of the projects.
- The majority of current projects are estimated to be pilots or medium-scale plantations (<1000 ha). Numbers for pilots are believed to decrease; medium and large-scale plantations (>1000 ha) will increase.

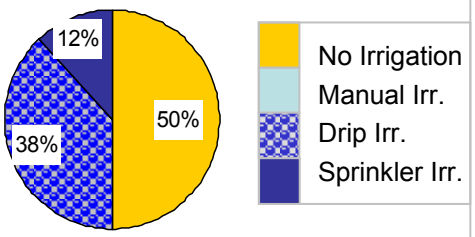
Plantation Model



Value Chain Elements



Irrigation Models



Prices

Seeds (per kg /dry)	**$0.21-2.85**
Labour (per day)	**$5.7-14.26**
Diesel at pump	**$0.57-0.77**

11 experts interviewed
13 projects analysed

4 China

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
Panzhihua Jatropha Biodiesel Industry Development, Baker Biofuel Company (USA)	1		Panzhihua, Sichuan Province	10,000	135,000
Forestry Ministry of LuoDian County	1		Luodian, Guizhou Province	8,600	15,000
Yunnan Shenyu New Energy Co. Ltd	2/3		Honghe, Yunnan Province	20,000	150,000
Sunshine Technology	1		Honghe, Yunan Province	10,000	---
Chinese Academy of Science-South China Botanical Garden	1		Guangzhou Province, Xishuangbanna, Yunan Province	1	---
Shaotong Forest Ministry,ECO—CSRBONE(France),Sichuan Yangtzriver Tech Co. Ltd	3		Shaotong County, Yunan Province	20,000	---
China National Petroleum Corporation (CNPC)	2/3		Sichuan,Yunan Province	0	40,000
CNOOC	1		Hainan Province	0	200,000

Commercial project

Non-commercial project

1 Interview / Questionnaire with project representative

2 Interview / Questionnaire with external project expert

3 Public sources

4 China

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
COFCO	2/3		Guizhou Province	0	---
Biodiesel Manufacturing Company (UK)	2/3		Guangxi Province	0	30,000
Cobra Biodiesel, University of Science and Technology, Beijing	1			10	10,000
Yunnan Plant Oil Group and German Energy Strategy Consulting Company	2/3		Yunnan Province	0	50,000-70,000

Acreage non-disclosed projects	36,640	66,641
Total	**105,251**	**706,641**

Commercial project

Non-commercial project

1 Interview / Questionnaire with project representative

2 Interview / Questionnaire with external project expert

3 Public sources

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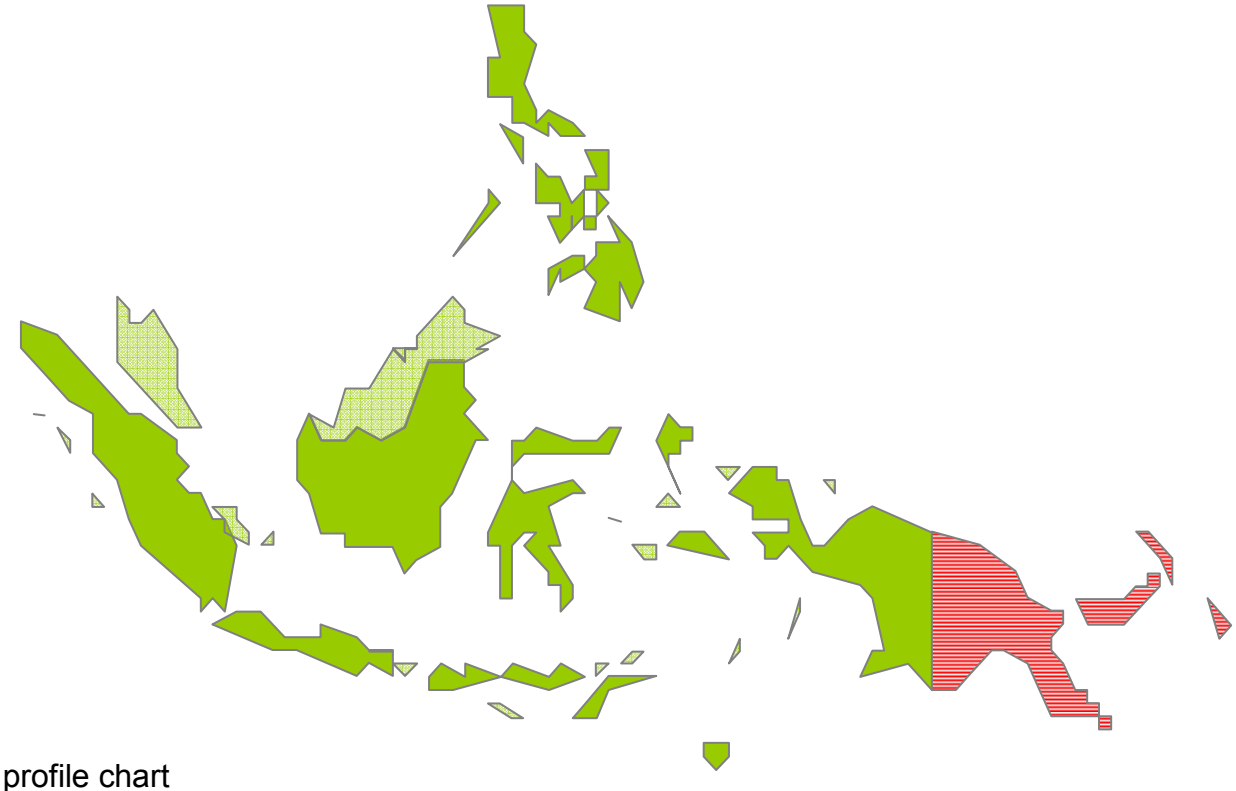

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country in brief chart
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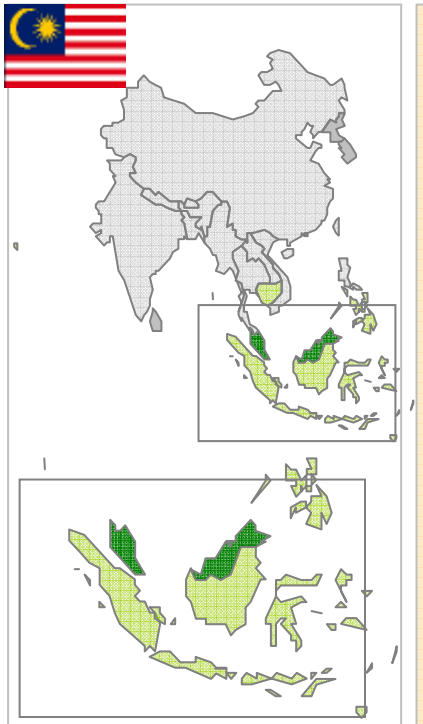
5 South-East Asia – Malaysia



Malaysia

✓ Jatropha exists ☐ Jatropha locally used ✓ Commercially farmed

Policies: At present, no policy or legislation specifically supporting Jatropha cultivation exists, but is reported to be currently drafted.

So far, the development of Jatropha cultivation has been comparatively slow and project activities are still on a low level. Most projects have only been set up recently and are mainly run and owned by foreign companies, with few exceptions.

The main reason for the reluctant development are apparently high costs for land acquisition (compared with neighbouring states) and a shortage of low-cost labour. Country expert report that small-scale farmers have not yet started to grow Jatropha.

Projects: A total current acreage of 1,712 ha has been identified. Project owners state plans to increase the cultivation scale to a total of 57,601 ha by 2015. The Ministry of Plantation of Industries and Commodities is undertaking a Jatropha pilot research project for which 300 ha have been allocated. Some international, leading oil company report plans to develop Jatropha projects in Malaysia. A few local private companies have engaged in Jatropha cultivation scaling from 400 ha to 1000 ha.

5 South-East Asia – Indonesia

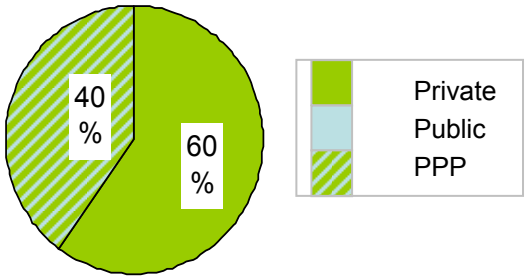
Summary & Comments

Indonesia is one of the leading Jatropha producers worldwide. Several experts expect Indonesia to be the first country to place significant quantities of Jatropha biofuels on the market. Some of the leading international Jatropha oil companies are currently investing in Indonesia. They reportedly aim mainly to establish large-scale plantations and outgrower schemes. More than 25 million ha, an area larger than the United Kingdom, are believed to be suitable for Jatropha cultivation. However, in regions that are favourable for palm plantations, Jatropha seems a less attractive option.

Scale of Jatropha Cultivation

	Expert Estimate	Projects identified
current	188,333 ha	75,671 ha
2010	1,767,143 ha	1,160,871ha
2015	5,184,167 ha	7,036,951 ha

Project Ownership



Government Programs

Jatropha / Biofuel Legislation
The government supports Jatropha within its strategic plan to develop biofuels as an alternative to conventional fuel sources. It has installed a national team for biofuel development (Tim Nasional Bahan Bakar Nabati or Timnas BBN). No government purchasing policy or guaranteed prices have been reported.

Other Means of Support
The government supports companies that grow Jatropha through low-interest loans. Research programs also receive support.

Government Targets on Jatropha
The government has set a target of 2 million ha to be cultivated with Jatropha by 2010. Biofuels are to contribute with 5% to the total energy mix by 2025.

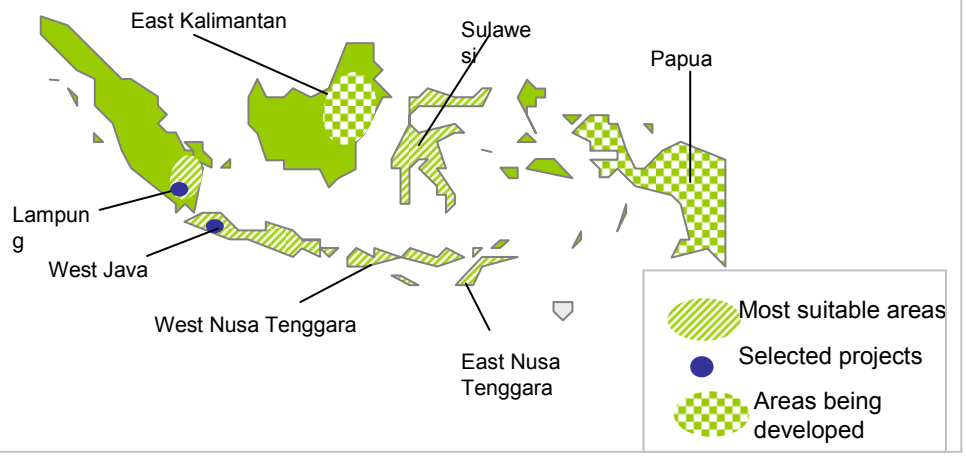
Barriers for Jatropha Investments
In several areas, Jatropha competes with palm oil plantations which are economically more attractive.

NGO-Initiatives
Sinarmas, Bakrie, Rekayasa Industri,Indonesia Biodiesel Forum

5 South-East Asia – Indonesia

Regional Distribution

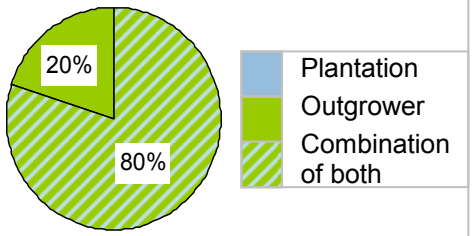
At present, Jatropha plantations are found in West Nusa Tenggara, East Nusa Tenggara, West Java, Lampung and Sulawesi. More plantations are reported to be developed in East Kalimantan and Papua in the coming year.



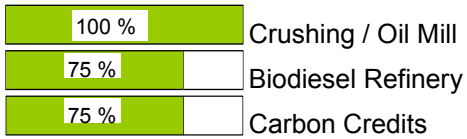
Project Evaluation

- 60% of projects are privately owned and more than 80% profit-oriented.
- Fertilisation is widely used as a cultivation technique. A majority of the projects apply pruning, root treatment and intercropping. Half of the projects use irrigation. Country experts suggest manual irrigation as the predominant scheme.
- Most projects aim to set up their own oil milling facilities and biodiesel refinery. The use of carbon credits is comparatively high (75% of projects) – mostly CDM credits under the UNFCCC scheme.
- According to project owners identified, the large majority of projects are developed on non-agricultural and waste land.
- Sustainability policies exist for most of the projects.

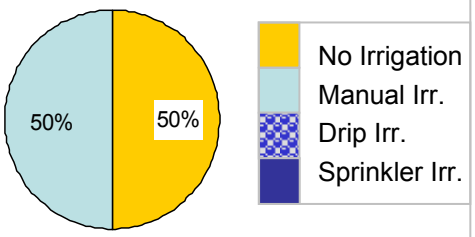
Plantation Model



Value Chain Elements



Irrigation Models



Prices

Seeds (per kg /dry)	**$0.1-0.44**
Labour (per day)	**$2-4**
Diesel at pump	**$0.49-0.93**

10 experts interviewed
12 projects analysed

5 South-East Asia – Indonesia

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
National Federation of Rural Cooperative Jatropha Project	1		All over Indonesia	5,000	5,000,000
Jatoil,Biodiesel Austindo	1		Provinces of Lampung and Nusa Tenggara Timur (NTT)	1,000	200,000
D1-BP Crop Fuels Ltd.	1			39,400	---
PT. Kreatif Energi Indonesia	1			300	---
Biogreen Energy Sdn. Bhd,Malaysia	1			600	300,000
Enhanced Biofuels Technologies Pvt Ltd	3			0	500,000
PT Rajawali Nusantara Indonesia (RNI)	3		Indonesia, central,west and east Java	10,000	100,000
China Agro-Technology Ltd.	3			20,000	197,680
Sinopec China	3		Papua and East Kalimantan	0	---
CARE	1			300	500
Asia Pacific Biofuel Corporation	1		P.T.Sugico Graha	0*(tbc)	700,000
SBRC, Surfactant and Bioenergy Research Centre, Bogor Agricultural University	1			50	---

Acreage non-disclosed projects	-	38,721
Total	**75,671**	**7,036,951**

Non-commercial Commercial

1 Interview / Questionnaire with project representative
2 Interview / Questionnaire with external project expert
3 Public sources

5 South-East Asia – The Philippines

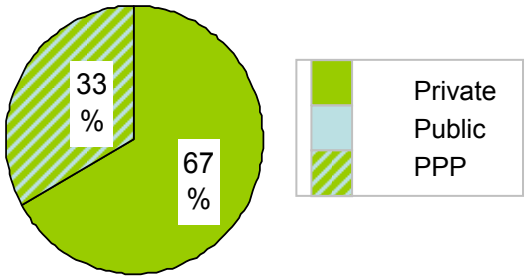
Summary & Comments

Jatropha is commercially farmed in the Philippines and actively promoted for energy use by the Government. All local government units are expected to develop their own Jatropha farming areas and to set up biofuel standards. The government is very supportive in aspects of finance, research and land availability. The state-owned company PNOC-AFC has invested into Jatropha, with the goal of establishing large scale plantations. However, consolidating land after years of subdivision may pose a problem, according to country experts.

Scale of Jatropha Cultivation

	Expert Estimate	Projects identified
current	3,833 ha	3,774 ha
2010	245,000 ha	23,009ha
2015	1,073,333 ha	1,382,609 ha

Project Ownership



Government Programs

Jatropha / Biofuel Legislation
The Biofuels Law of 2006 supports biofuel plantation through a favorable investment climate. It provides financial support like agro-industrial and cooperative loans. Government funding has been provided for research on Jatropha variety selection, cultivation management, intercropping, and land use at discounted lease rates. Jatropha is also included in the anti-poverty alleviation program. The National Biofuels Board was established to help develop biofuel production.

Government Targets on Jatropha
The government target is reported as 700,000 ha cultivated by 2010.

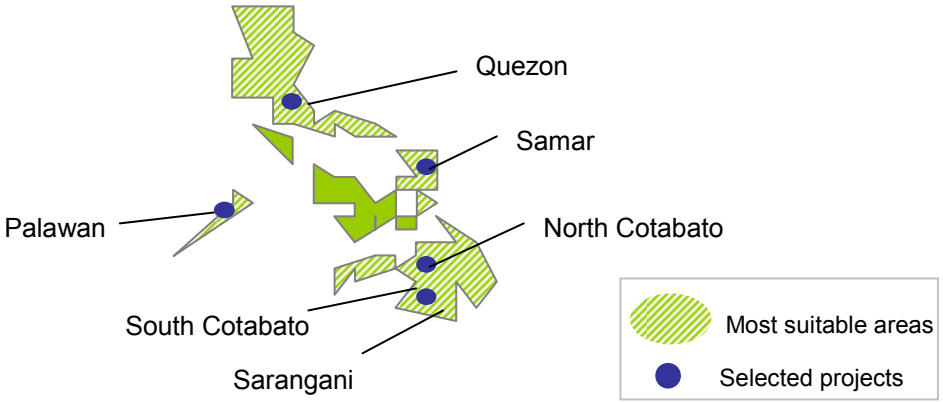
Barriers for Jatropha investments
The main challenge is the difficulty in consolidating land after years of Land Reform subdivision. Slow investment inflow and limited capital investment may be another issue for Jatropha development.

NGO-Initiatives
USAID, Samasa Consortium, Angelo King Foundation, The Philippine Jatropha Association

5 South-East Asia – The Philippines

Regional Distribution

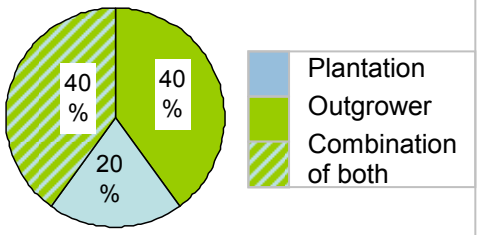
Jatropha is grown widely across the Philippines. The Luzon region in the north, the Mindanao region in the south as well as the Eastern Visayas and Palawan Island in the central Philippines apparently have favourable climatic and soil conditions for Jatropha production.



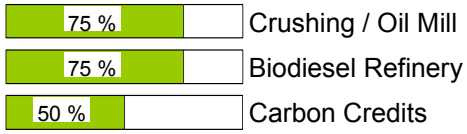
Project Evaluation

- All projects identified apply pruning, fertilisation and intercropping as cultivation techniques. Half of the projects use root treatment and irrigation.
- Country experts report a lower rate of irrigation, mainly through manual schemes.
- Three quarters of the projects aim to set up oil milling facilities and biodiesel refineries.
- Use of carbon credits is common with 50% of projects participating in the UNFCCC schemes (CDM)NFCCC scheme) or voluntary schemes.
- The majority of projects identified are being developed on waste land.
- Sustainability policies are reported for most of the projects.

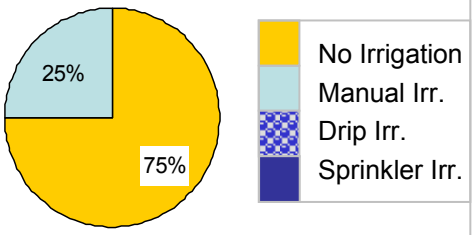
Plantation Model



Value Chain Elements



Irrigation Models



Prices

Seeds (per kg /dry)	**$0.12-0.85**
Labour (per day)	**$4.85-6.8**
Diesel at pump	**$0.85-0.92**

7 experts interviewed
9 projects analysed

5 South-East Asia – The Philippines

Project	Source	Type	Project Location	Ha (2008)	Ha (2015)
Lacto Asia Pacific Corporation	1			300	20,000
Green Eight Industries Inc.	1		Not disclosed	-	-
PNOC Alternative Fuels Corporation	1		islands of Palawan and Mindanao	800	700,000
Biogreen Energy Sdn. Bhd,Malaysia	1			50	100,000
Agricultural Systms Cluster	1			15	500
Asia-Pacific Biofuels Corporation	1		South Cotabato, Glan, Sarangani Province, Mulanay, Quezon	0*	60,000
Abundant Biofuels Corporation	3		Lumad lands on the island of Mindanao	0	480,000
Korean International Bio (KIBio) 2007 Corp	3		Samar	300	5,000
			Acreage non-disclosed projects	2,309	17,109
			Total	**3,774**	**1,382,609**

Commercial project

Non-commercial project

1 Interview / Questionnaire with project representative

2 Interview / Questionnaire with external project expert

3 Public sources

Contact

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