

Supply Chain Requirements for Jatropha Success in Ghana

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Jatropha – Plant Details

Jatropha Curcus - a drought-resistant perennial,
Fruiting tree life of 40 to 50 years

Rainfall: Grows on semi arid land unsuitable for forestry or agricultural use. Mean annual rainfall: 300-1000 mm or more

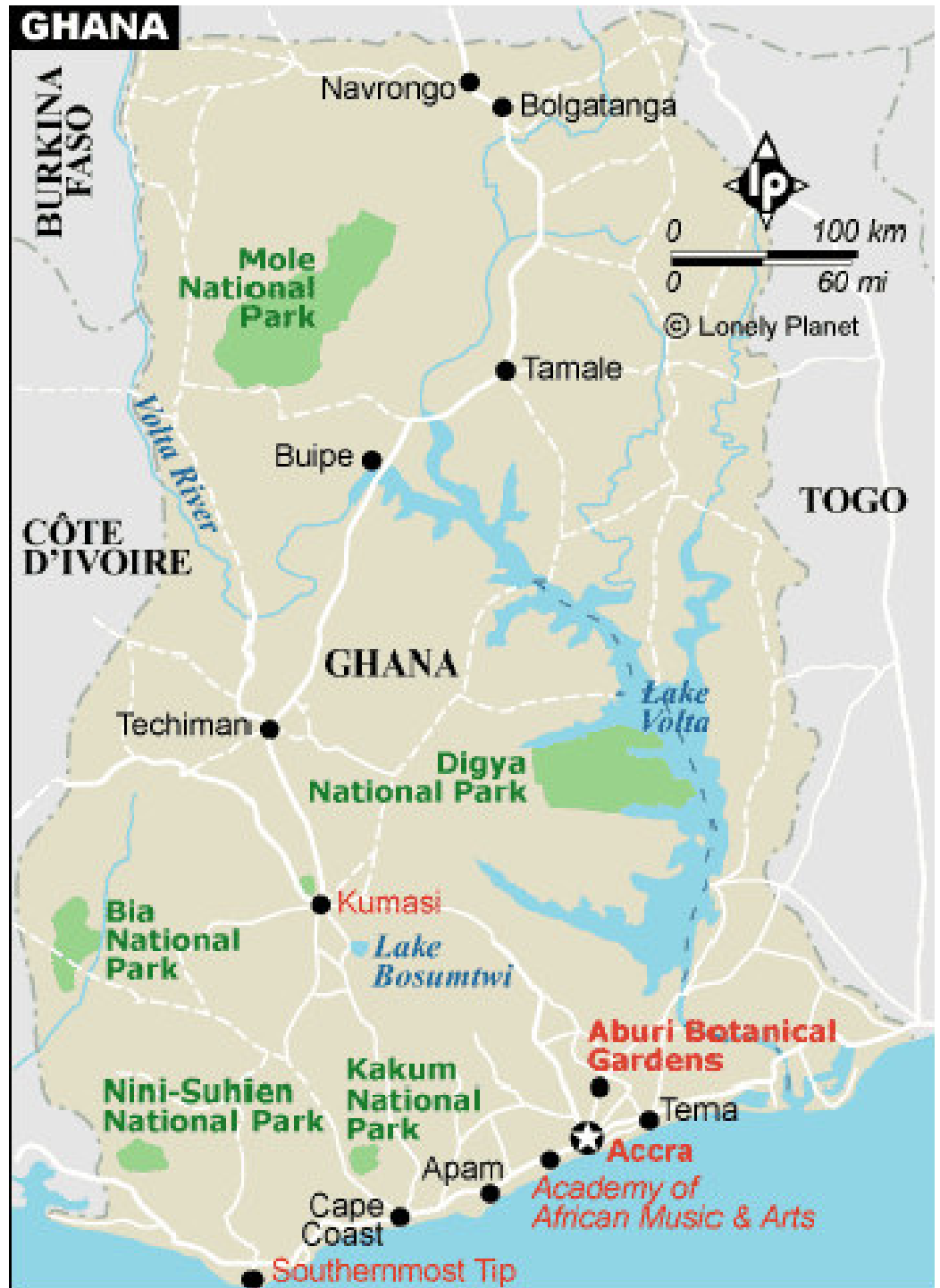
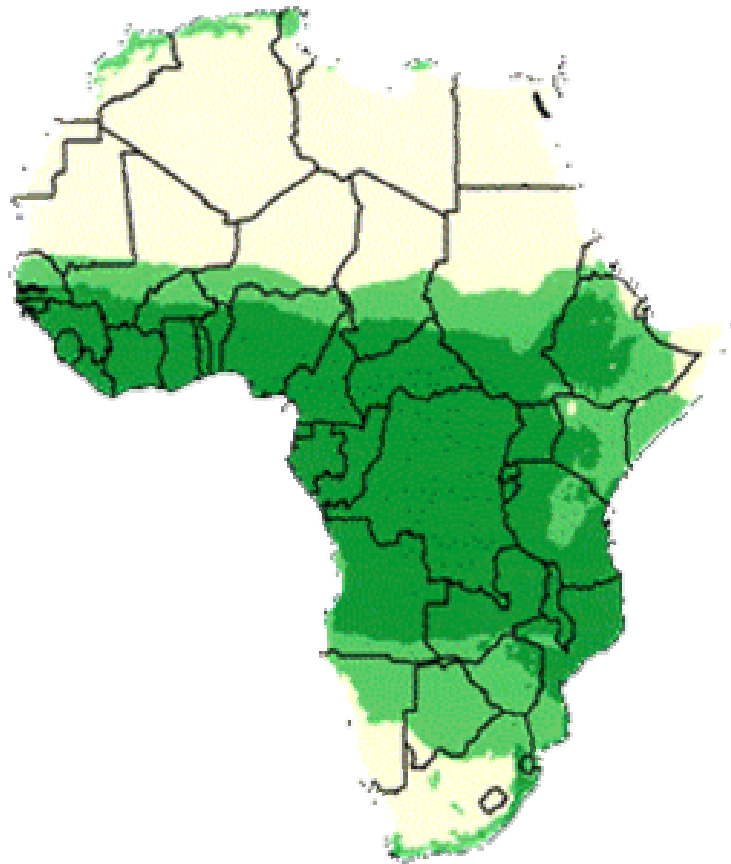
Altitude: 0-500 m,

Mean annual temperature: 20-28 C.

Soil type: Grows on well-drained soils with good aeration and is well adapted to marginal soils with low nutrient content.

Jatropha – Non Food Feedstock for Biodiesel













Jatropha – Non Food Biofuel





Standard and Improved



Jatropha Africa – Business Development

Founded in 2006 by Ohene Akoto and Clive Coker

Profit sharing land and labour agreement with 3 villages

Lease on 50,000 Ha

100 Ha farm established

First harvest and sales of JA Improved seeds during 2009.

Good relations with out-growers

A joint venture with an EU based company, could lead to further inward investment.





Jatropha Africa working in partnership with rural communities







Seeds, Oil, Cake



Jatropha Seed Composition

Fats and oils	38.00 %
Protein	18.00 %
Carbohydrates	17.00 %
Fibre	15.50 %
Moisture	6.20 %
Ash	5.30 %

Oil content 25 – 41% in the seeds

Jatropha Oil Composition

Filtered raw Jatropha oil is in demand by oil refineries.

Technical specifications of Jatropha oil are excellent :

Low waxing temperature can be 'winterised'

As with all biofuels, Jatropha is low in Sulphur.

When burnt it produces fewer particulates.

Can be used as direct fuel (with additives) in engines

The oil content is 25 – 41% in the seeds

Jatropha Oil Composition

Flash point	240/110 °C
Carbon residue	0.64
Cetane value	51.0
Distillation point (°C)	295 °C
Kinematics Viscosity	50.73 cs
Sulphur %	0.13 %
Calorific value	9 470 kcal/kg
Pour point	8 °C
Colour	4.0
Viscosity (cp) (30 °C)	52.6 (5.51)2
Specific gravity (15 °C/4 °C)	0.917 / 0.923
Solidfying Point (°C)	2.0
Saponification Value	188 . 198
Iodine Value 3	90.8 -112.5
Refractive Index (30°C)	1.47
Acid value	1.0 - 38.2
Palmitic acid %	4.2
Stearic acid %	6.9
Oleic acid %	43.1
Linoleic acid %	34.3
Other acids %	1.4

Jatropha Seed Cake



Seed cake from oil extraction can be used for biomass energy or compost

Turning the seed cake into charcoal produces a low smoke fuel for cooking



Jatropha – Key Points Against

Jatropha plants take 5 to 6 years to reach mature yields.

(Long term investment thinking is required)

Jatropha is toxic – non food.

(Educate rural communities to avoid harm)

Jatropha is grown by some farmers on land suited to food.

(Set policies to encourage Jatropha farming to start on land not previously used for food production.

Set policies to prevent biofuels from displacing food production.)



Jatropha – Key Points In Favour

Jatropha oil can be blended with Diesel and Aviation Fuel

Jatropha oil is an attractive feedstock for aviation fuel

Jatropha oil can fuel modified diesel engines with additives

Jatropha can be grown on land never used for food production

Jatropha is a non-food crop, so demand for Jatropha need not distort food prices

Jatropha grown in Africa since the 16th century (not alien).

Jatropha can bring agricultural and technical jobs to rural areas.

Countries can reduce fossil fuel dependency and increase GDP



Jatropha – Local Benefits

Growing, harvesting and processing of Jatropha offers a lot of jobs for local labour.

Jatropha plant and seeds are toxic, so they are not eaten by goats or other animals. This means that a hedge of Jatropha plants can keep animals outside the fields where food crops are grown.

There is scope for some food crops to be grown in between Jatropha in year 1. This intercropping can lead to food production (e.g. Beans and peppers)

Jatropha oil can be used in oil lamps, and in the production of soap, providing more jobs.

Press cake charcoal can be used as fuel.

Jatropha – Regional Benefits

Jobs for local labour in agriculture, can reduce drift of young people from villages to large cities.

Processing Jatropha oil into higher value products e.g. (Pure Plant Oil, Biodiesel, Aviation Fuel) can provide skilled jobs.

Growing Jatropha can remediate denuded soil – of relevance to open cast mining.

Biofuels can provide Corporate Social Responsibility benefits and reduce fuel costs to companies.

Jatropha – Global Benefits

The CO₂ emitted during combustion of biofuels, is first captured by the plant during its growth. This helps to stop the global CO₂ concentration rise in the atmosphere.

Over time CO₂ becomes tied up in the wood of Jatropha trees and in the leaves which enrich the soil, and thereby reduces the concentration of a greenhouse gas. Soil remediation.

The production of biofuels from vegetable oils can lead to less dependence on fossil fuels and lower imports.

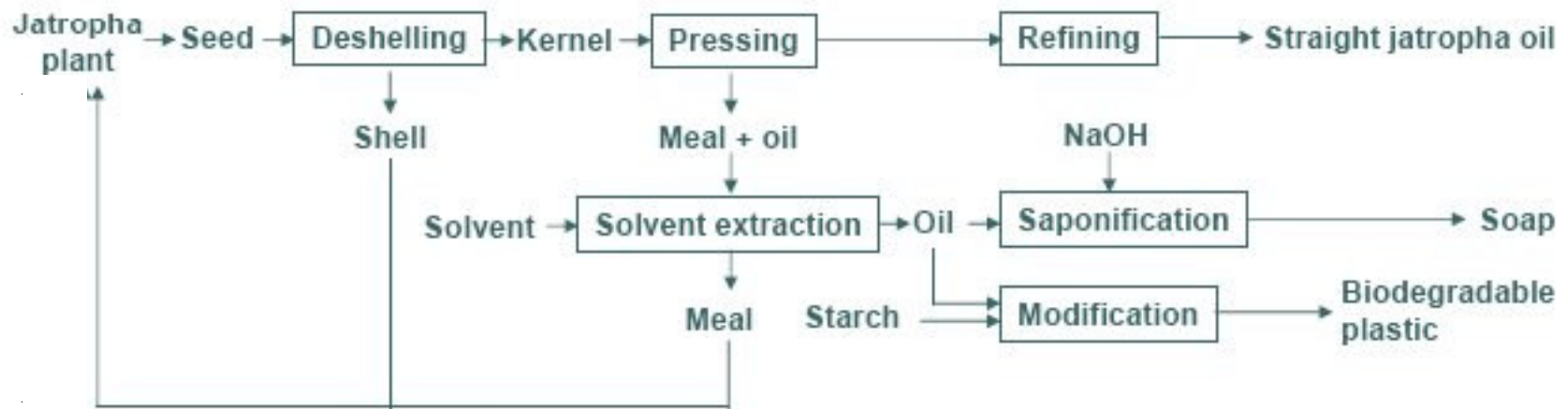
The large scale production of biofuels from vegetable oils can lead to additional revenues from exports.

Non food biofuels such as Jatropha, grown on land that has not been used for food production, or as fences around food crops, can result in no direct impact on food prices.

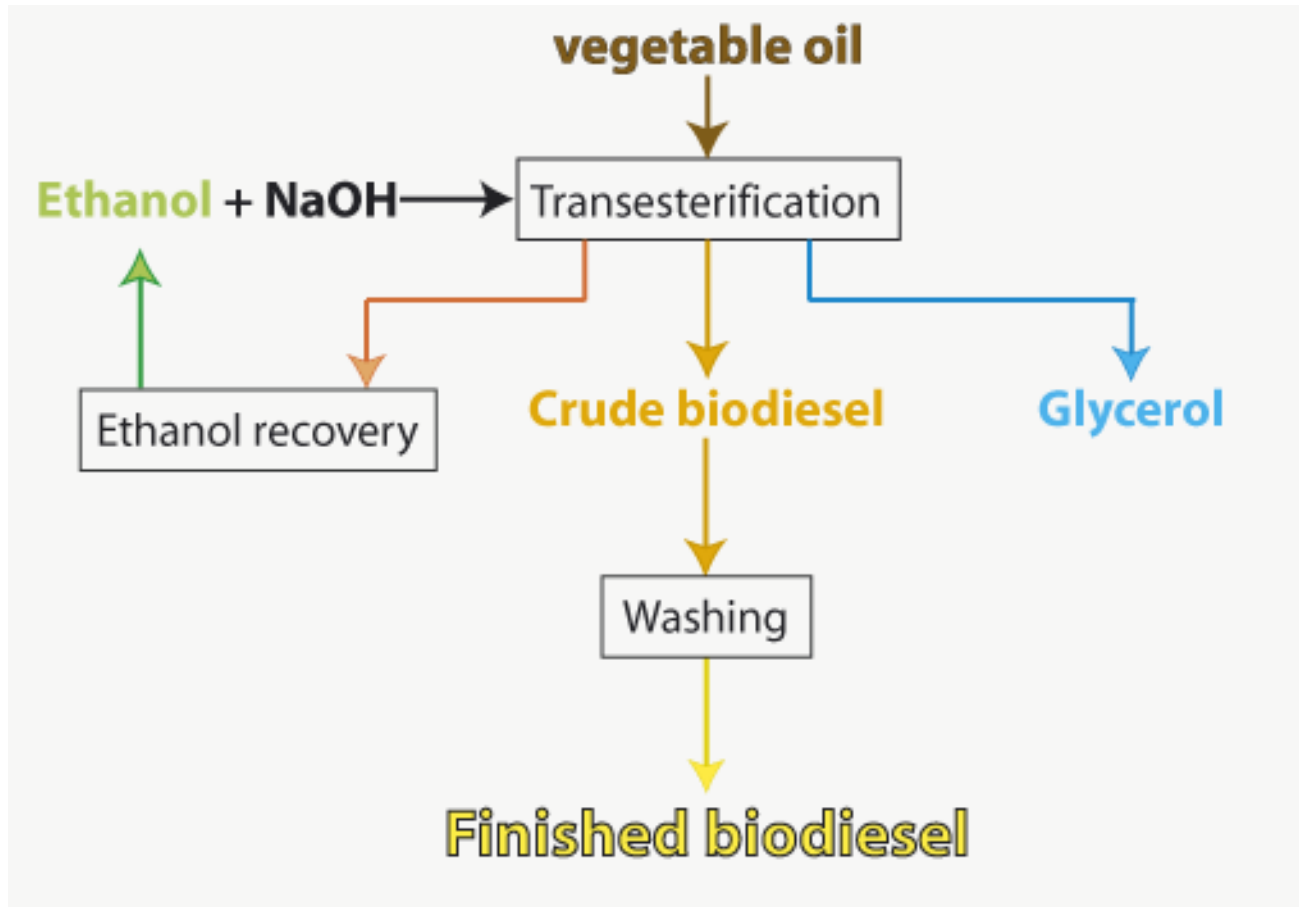
Jatropha Supply Chain



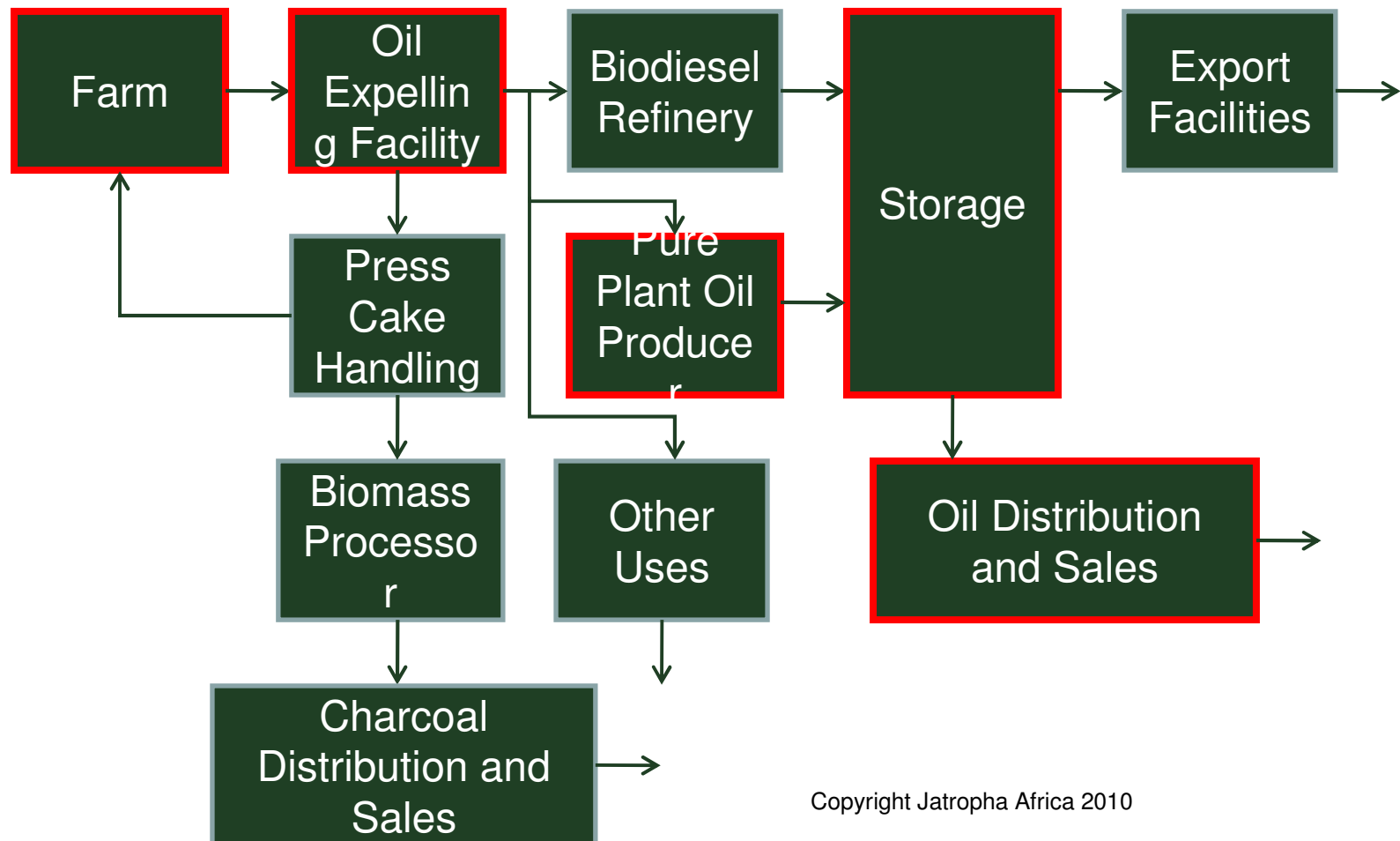
Jatropha Seed Processing



Biodiesel Processing



Jatropha Biofuel Supply Chain



Competence Platform on Energy Crop & Agroforestry Systems for Arid and Semi-arid Ecosystems – Africa

www.compete-bioafrica.net

Building on the Compete Programme - Dr Helen Watson

Identified promising biomass production and utilisation schemes







Skills for Non Food Biofuel Supply Chain



Scale



225,000 tons / year biodiesel

160,000 hectares

352 million Jatropha trees

725,000 tons of seed

500,000 tons of seed cake

320 tractors and trailers

Supply Chain – Requirements for Success

Establish relationships with users of Jatropha products

Improve Jatropha, high yielding and disease resistant variety

Establish oil expelling facilities

Establish charcoal production facilities

Establish soap production facilities

Develop PPO, and biodiesel production facility

Develop electricity supply systems for villages

Provide skills training for operation, maintenance and roll-out.



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Biofuel Feedstock Producer
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