



bio project

jatropha project syria

Jatropha plant

مشروع الجيتروفا والديزل الحيوي
المشروع التتموي في منطقة الغاب
Acropolis

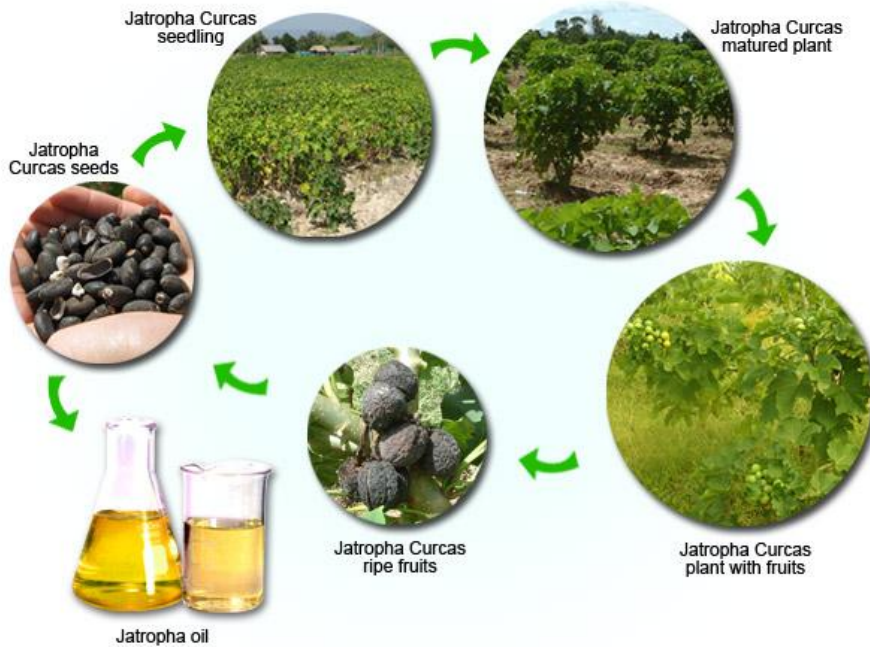
Feasibility study

المشروع الزراعي



وفق دراسة المجموعة من مركز اكساد لافضل انواع النباتات الحيوية المناسبة لمنطقة الغاب فقد كانت نبتة الجيتروفا هي الافضل , ووفق خطة المشروع يتضمن اقامة مشتل لانتاج اغراس الجيتروفا وزراعة كافة المساحات الزراعية والحراجية الخارجة عن الخدمة حيث تتمتع النبتة بامكانية الحياة وفق كافة انواع الترب بما فيها الترب الملحية وتروى بمياه صرف وغسيل التربة لذلك تزرع على حوانب اقنية الزراعية ومردود الهكتار من الجيتروفا يعادل 3 اضعاف مردوده من القمح او القطن وتكلفة الهكتار من الجيتروفا تعادل نصف التكلفة من اي نوع اخر من الزراعات واستهلاك المياه يقل للنصف ان المشروع الزراعي المقترح يشكل حلا انتاجيا لمشكلة

توفر المياه في منطقة الغاب حيث يتعرض الفلاح سنويا لمشكلة في موضوع الخطة الزراعية علما ان انتاج الجيتروفا مسوق مسبقا سواء بوضعه قبل التصنيع او بعد التصنيع حيث ينتج النبتة الوقود الحيوي والجليسرين والنفائات الناتجة عن العصر وهذه الانواع الثلاثة مسوقة دوليا





Why *Jatropha curcas* seeds?

In an age where concerns about rising fuel prices & dwindling energy resources are making headlines around the world, the value of using renewable and eco-friendly fuels has gained wide prominence. Bio-Diesel is a term used to describe environmentally safe & low-polluting fuels for standard combustion & turbine engines. Derived from vegetable oils, they are a safe & viable alternative to non-renewable, heavy polluting fuels.



Advantages of *Jatropha curcas* seeds

- *Jatropha curcas* seeds is easy to establish & with a speedy growth rate requiring minimum care.
- *Jatropha curcas* seeds does not need intensive care and very minimal input is required to sustain its growth.
- Can be grown on all kinds of soil varieties, and it grows even in wastelands.
- Drought-Resistant properties. *Jatropha curcas* seeds can be planted in the harshest of desert weather & on any type of soil.
- Plantation of *Jatropha curcas* seeds in rural areas helps in- Employment generation, Sources of alternate energy & providing increased earnings.
- *Jatropha* seeds can be used to increase green cover through the reclamation of wastelands and infertile lands.
- *Jatropha curcas* seeds is highly suited to preventing soil erosion.
- It does not inhibit the growth of other crops.
- With a high micorrhizal value in its roots, *Jatropha* helps in extracting phosphates from soil.
- Improves soil fertility by fallen leaves throughout their life cycle.
- Other than its use as bio-diesel, it even has medicinal as well as other uses.
- Generates net income for 30-35 years @ Rs.10,000/acre/year approx. from 4th year onwards .
- Rapid Growth in voluminous quantities.
- With high oil extraction potential of about 31-37%.
- As a Bio-fuel, it can be used in any diesel engine without modification.



Life Cycle of Jatropha

Jatropha Curcas is a drought-resistant plant, that grows well in the harshest of conditions and poorest of soils. Easy to establish, jatropha has a speedy growth curve, & produces seeds for well over for 50 years. Jatropha Curcas can grow in the harshest of conditions and in the most inhospitable of climates. A highly drought-resistant species, jatropha is specially adapted to arid and semi-arid conditions.

Jatropha is a wild crop in large areas of India and thrives even in infertile soil. Obtaining good crops can come with minimum effort. Depending on the quality of soil and rainfall measures, oil can be extracted from Jatropha nuts inside five years. With potential oil content of over 42%, Jatropha is indeed a good source of biodiesel. Jatropha oil burns flames that are devoid of smoke content.

Botanical Features

A small tree or shrub with smooth gray bark growing between 3 to 5 meters in height, and can attain heights up to 8 to 10 meters under good conditions.

Leaves

Large green, alternate to sub-opposite, three-to five-lobed with spiral phyllotaxis.

Flowers

Petiole length: 6-23 mm. In conditions suitable for continuous growth, an imbalance of pistillate or staminate flower production effects better results in a higher number of female flowers.

Fruits

Fruits of Jatropha are produced in winter, when the shrub is relatively leafless, or in case of excellent soil and moisture conditions, may produce several crops throughout the year. Inflorescence yields a 10 or more ovoid fruits.

Seeds

Seeds mature when the capsule changes from green to yellow, after two to four months. To optimize production of seeds with the maximum oil content of up to 42%, care needs to be taken while selecting seeds. Jatropha Curcas seeds are ideally collected from plants aged over 30 years.

Seed Treatment

The Identified jatropha seeds are soaked in a mixture of water mixed with 1% Potassium Chloride for a period of thirty hours. After the soaking, the seeds are treated with Pseudomonas or Tricoderma Veridi at 4 Gms / Kg. of seed, along with a rice gruel paste and are dried for over two hours in the shade. Prior to sowing, seed bags are filled with a mixture of red Soil, Sand and organic Compost at 1:1:1 ratio. DAP and Bio Fertilizers are also added to the mixture. The seeds are watered regularly and within two months 2 months, saplings are ready for plantation.



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Planting

Suitable land has to be identified without water logging possibilities and not present a clay soil for Jatropha. Plants are watered once in a week until establishment then watered only if there is a failure in the natural monsoon cycle.

Managing Growth

The growth of Jatropha plants as with other growing plants have to be managed through a system that includes:

- Application of Fertilizers
- Using Growth Promoters
- Pruning Unwanted growth
- Pest Control & Disease Control Measures

Flowering Stage

Flowering occurs during the wet season and in perennially humid regions, flowering occurs all through the year. Seeds mature in about three months after flowering.

Harvest

The maturity stage of Jatropha takes over 60 days from the onset of flowering.

Advantage

Jatropha plantations can generate incomes upwards of Rs. 25,000/- per hectare to over Rs.50, 000 from the fifth year of cultivation. The low gestation periods & high yields make them particularly suited to the needs of the biodiesel industry as well as for the development of farming communities & individuals.

General

Climate

Can withstand severe heat. Likes heating and doing well in warmer areas. When cold will drop its leaves. It can withstand light frost but not for prolonged periods. The older the tree the better it will withstand. Black frost will almost certainly kill young plants and severely damage older plants

Quality of the soil

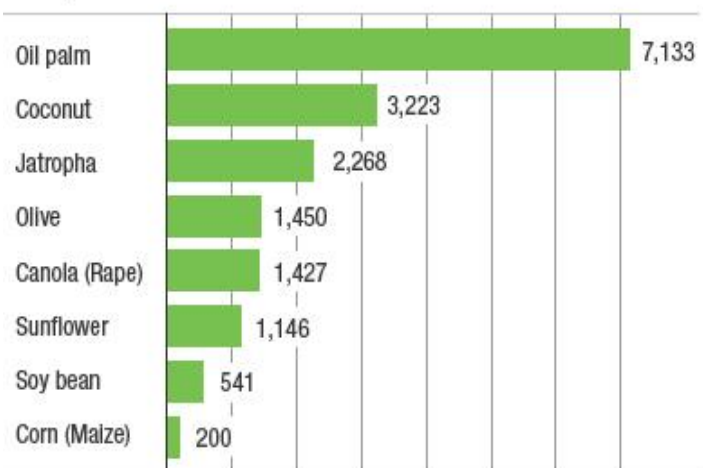
Best in sandy well-drained soils. Can withstand very poor soils and grow in saline conditions All the actors in the Jatropha sector suggest, anyway, using organic fertilizer in order to obtain higher yield.

Irrigation

It handles dryness very well and it is possible to live almost entirely of humidity in the air. - See Cape Verde where rainfall is as low as 250 mm a year. Differences are expressed in what

Resources for Biodiesel

Yield per hectare in liter*



*Under optimal conditions Quelle: Phillips McDougall, January 2008 · Copyright © Bayer CropScience



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is optimum rainfall as some readings say 600 mm and some say 800 mm whilst some areas in India report good crops with rainfall of 1380 mm. Under irrigation 1 500 mm is given.

500 - 600 mm of rainfall is the limit. Below it the production depends on the local water condition in the ground

It will also stand for long periods without water - up to 2 years – and then grow again when rains occur again.

Weeding

Standard cultural practices are timely weeding (4 times a year), proper fertilization, surface ploughing and pruning. With these management practices a yield around 15-20 kg of fruit per tree can be obtained even if the plants did not reach full maturity.

Use of fertilizer

Although *Jatropha* is adapted to low fertility sites and alkaline soils, better yields seem to be obtained on poor quality soils if fertilizers containing small amounts of calcium, magnesium, and Sulfur are used. Mycorrhizal associations have been observed with *Jatropha* and are known to aid the plant's growth under conditions where phosphate is limiting. It is recommended that 1 kg of farmyard manure/ plus 100 g of Neem waste for every seedling, with a recommendation of 2500 plants per ha this comes up to 2.5 t organic fertilizer per ha. Besides it after transplantation and the establishment of the plant fertilizer such as N, P and K should be applied. Twenty gram urea + 120 g SSP and 16 g MoP should be applied annually

The possibility to return the press-cake (or part of it) to *Jatropha* fields should be carefully considered.

Crop density

References recommend spacing for hedgerows or soil conservation is 15cm - 25cm x 15cm-25cm in one or two rows respectively and 2m x 1.5m to 3m x 3m for plantations. Thus there will be between 4,000 to 6,700 plants per km for a single hedgerow and double that when two rows are planted.

Satisfactory planting widths are 2 x 2 m, 2.5 x 2.5 m, and 3 x 3 m. This is equivalent to crop densities of 2500, 1600 and 1111 plants/ha, respectively. Distance OF 2MX2M

CULTIVATION

Wider spacing is reported to give larger yields of fruit.

Genotype

Little genetic research seems to be performed, as Information related to the project seems to be rather restricted.

Pruning

Pruning – 1st prune
The plants need to produce side shoots for maximum sprouting and maximum flowers and seed.

Between 90 and 120 Days top of all plants at 25 Cm. Cut the top off cleanly and cut top to produce 8 – 12 side branches.





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It is considered good practice. In order to facilitate the harvesting, it is suggested to keep the tree less than 2 meters.

Inter-cropping

Specific intolerance with other crops was not detected. On the contrary the shade can be exploited by shade-loving herbal plants; vegetables such red and green peppers, tomatoes, etc.

Picking

We have developed the harvest methodology between wet and dry seed crush costing applicable has been compared.

CROP YIELD

It appears very difficult to estimate unequivocally the yield of a plant that is able to grow in very different conditions.

Yield is a function of water, nutrients, heat and the age of the plant and other. Many different methods of establishment, farming and harvesting are possible. Yield can be enhanced with right balance of cost, yield, labor and finally cost per Mt

Seed production ranges from about 2 tons per hectare per year to over 12.5t/ha/year, after five years of growth. Although not clearly specified, this range in production may be attributable to low and high rainfall areas.



General Description

Common Name	Jatropha, White Physic Nut
Botanical Name	Jatropha Curcas
Family	Euphorbiaceous
Height	3-4 Meters.
Plant Type	Large Shrub
Place of Availability	500-1200 meters above sea level
Time for Fruits	October to December
Quantity of seeds per Kg	1200 to 1500
Uses	Biodiesel, Jatropha Oil, Cosmetics, Candle Industry, extremely useful in case of barren lands, Ground Improvisation, prevents erosion, decoration of gardens.

Cultivation of Jatropha

The cogent reasons are: Jatropha plants...

- Grow even on **marginal/saline/acidic/alkaline soils** and sloppy lands.
- Develop **without** much **care** and **irrigation**.
- Suit even dry-land farming and **survive drought**.
- Provide **live hedge for farms** to arrest the menace of stray cattle.



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- Generate **rural employment** for cultivation, seed collection and processing.
- Need **hardly any** application of **pesticide**.



- Generate **net income** for 35-40 years @ about **Rs.10,000/acre**, from 4th year.

- Improve **soil fertility** throughout their life-cycle.

- Provide **fuel wood** after 50 years' life-span.

- Possess **medicinal** as well as other multiple **uses**.
- Create **green cover** for long term **ecological benefits**.

Enhance **energy security** for the country

How can farmers achieve hr productivity and profitability?

- Plant at 2x2 m in 60x60x60 cm pit filled with soil mixed with 2 kg organic manure.
- Drip irrigates, if possible; monsoon, little; winter, fortnightly; summer, frequently.
- Prune main stem upon 1.5 m growth for profuse branching and higher seed yield.
- Spray foliage with growth promoters for higher yield of seeds and oil.
- Ensure maximum exposure to sunlight for enhancing seed yield.
- Use inter-cropping for first 2-3 years for income while Jatropha plants mature.



Specialties of Jatropha

Could be grown in less productive areas, shallow fields, rocky terrains and areas with scanty or excess rainfall ,Animals do not consume Jatropha; hence it could be used on mass level to improvise barren lands ,Jatropha could be easily grown from stem and seeds. It grows extremely fast.

Within 2 years of plantation, it starts to produce seeds and keeps on producing until the age of 50 years.

For one hectare of plantation, depending on density and quantity, 3-10 tones of Jatropha seed could be obtained.

Jatropha is a plant with many uses, its skin produces tannin, and various parts have different medicinal properties. The oil produced by Jatropha seeds has various medicinal properties.

The latex of Jatropha contains an element jatrophone which is 'Anti-Cancerous'. The extract from the leaves is used to cure piles and raw leaves help in cleaning teeth and other dental problems.



Jatropha oil is strongest substitute for diesel. Apart from this it is used for producing soap, candles and cosmetics.

While burning Jatropha does not emit fumes, hence in rural areas it is used for lighting purposes. In China Jatropha Oil is used for making Varnish.

The skin leaves and raw leaves of Jatropha are used in making dyes.

Botanical Features

It is a small tree or shrub with smooth gray bark, which exudes whitish colored, watery, latex when cut. Normally, it grows between three and five meters in height, but can attain a height of up to eight or ten meters under favorable conditions

Leaves

It has large green to pale-green leaves, alternate to sub-opposite, three-to five-lobed with a spiral phyllotaxis.

Flowers

The petiole length ranges between 6-23 mm. The inflorescence is formed in the leaf axial. Flowers are formed terminally, individually, with female flowers usually slightly larger and occur in the hot seasons. In conditions where continuous growth occurs, an unbalance of pistillate or staminate flower production results in a higher number of female flowers

Fruits

Fruits are produced in winter when the shrub is leafless, or it may produce several crops during the year if soil moisture is good and temperatures are sufficiently high. Each inflorescence yields a bunch of approximately 10 or more ovoid fruits. Three, bi-valved cocci is formed after the seeds mature and the fleshy exocarp dries.

Seeds

The seeds become mature when the capsule changes from green to yellow, after two to four months. The trees are deciduous, shedding the leaves in the dry season. Flowering occurs during the wet season and two flowering peaks are often seen. In permanently hu-mid regions, flowering occurs throughout the year. The seeds mature about three months after flowering. Early growth is fast and with good rainfall conditions nursery plants may bear fruits after the first rainy season, direct sown plants after the second rainy season. The flowers are pollinated by insects especially honey be

Profitability Analysis of Jatropha





S.No.	Details	Rate per Hectare
1.	No. of plants per hectare (Distance 2X2 meters)	2500 plants
2.	Output of 100% plants	2500 plants
3.	Assuming that the production of seeds starts in the 3 rd year(2 Kg. Seeds per plant)	5000 Kgs. (5 Quintals)
4.	Income per Hectare Current rate Rs. 3.00 per Kg.	Rs. 30000 per hectare
5.	Expense occurred for 3 years	Rs. 30000.00
6.	Return on Expense	Rs. 45000.00
7.	Hectare profit in 5 th year	Rs. 15000.00
8.	Profit per hectare from the 6 th year 2500 X 2Kg. (Rs. 2.00 per kg)	Rs. 15000.00 per year

Tips on successful plantation of Jatropha

The place of plantation should not accumulate water. Excess water can cause adverse effect on Jatropha plants. It can also be planted on the borders of the field, thus acting as a fence to generate additional revenue Jatropha curcas grows almost anywhere, even on gravelly, sandy and saline soils. It can thrive on the poorest stony soil. It can grow even in the crevices of rocks. The leaves shed during the winter months form mulch around the base of the plant. The organic matter from shed leaves enhance earth-worm activity in the soil around the root-zone of the plants, which improves the fertility of the soil. Regarding climate, Jatropha curcas is found in the tropics and subtropics and likes heat, although it does well even in lower temperatures and can withstand a light frost. Its water requirement is extremely low and it can stand long periods of drought by shedding most of its leaves to reduce transpiration loss. Jatropha is also suitable for preventing soil erosion and shifting of sand dunes.



Digging the Pit

The pit should be of following dimensions , Length 1 ft., Width 1 ft. & Depth 1 ft, The distance between two pits should be minimum 2 meters (6 ft.) and the distance between two rows of plants should also be minimum 2 meters. The digging of pits should be done during the months of March and April.





While planting on the borders of the field, the distance between two plants should be minimum 1 meter.

Filling of Pits

the pits dug in the month of March-April should be filled in the end of May. To fill the pit use 3 parts of the mud of the plantation area, 3 parts black/productive mud and 3 parts dung manur and mix them thoroughly. This mud-manure mixture should then be treated with one spoon of Chloropyriphos for prevention against termites. The pit should be filled half of its depth with this mixture.

Plantation

The process of plantation should start with the arrival of rains during the first or second week of June. Remove the Poly-bag of the plant and place it in the half filled pit. Please take due care that the mud-manure mixture comes out of the pit while filling the pit.

Emergency Irrigation

During the first year of Plantation Jatropha, normal care is required for the proper development of the plant. Hence water the plant whenever required so that the plant and leaves don't burn out.

Protection from pests/insects/diseases

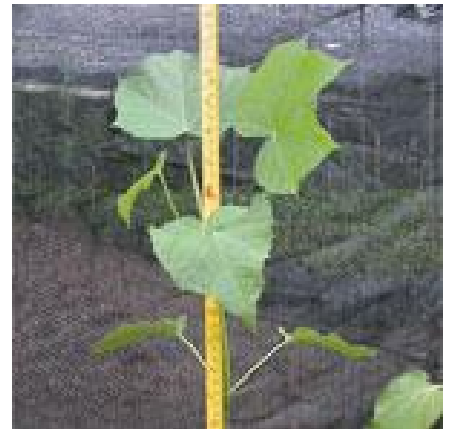
preventing the plant against pests, insects or diseases is extremely important during the first year. In case of any outbreak of disease or pest, spray pesticides like Nuvocron or Indosulphon along with Copper Sulphide.

Pruning

In order to limit the height of Jatropha Plant to obtain maximum seeds, the process of pruning has to be carried out during winters. During the first year the stem of the plant should be severed with a razor sharp blade at the height of 1.5 feet. Following this the plant will grow many branches which should be cut next year during January leaving one third part intact. As mentioned, after pruning, the plant would grow numerous branches. Maintaining the height of the plant, try to give it an umbrella shape so that it provides maximum which are easy to collect.

Co-Existing Crops

Owing to the fact that the plantation area is properly leveled along with productive mud, the empty space between the rows of Jatropha plants could be used to plant crops like Onion, Chilly and other Medicinal/Perfume plants. During the later years it could be used for crops like turmeric and ginger.



Jatropha Plants with fruits



About Jatropha Curcas

Jatropha Curcas is a non edible oil crop predominately used to produce bio-diesel.

In addition to bio-diesel production, the by-product of Jatropha Curcas' trans-etherification process can be used to make a wide range of products including high quality paper, energy pellets, soap, cosmetics, toothpaste, embalming fluid, pipe joint cement, cough medicine and as a moistening agent in tobacco.

The Jatropha Curcas seed cake which is the waste by-product of the bio-diesel Trans etherification process can be used as a rich organic fertilizer.



Jatropha Curcas grows best on well drained soils (pref PH 6-9) with good aeration but is well adapted to marginal soils with low nutrient content.

Jatropha Curcas grows well with more than 600mm rainfall per year and it can withstand long periods of drought. The plant sheds its leaves during a prolonged dry season.

Jatropha Curcas prefers temperatures averaging 20-28 degrees Celsius (68-85 degrees Fahrenheit). It can, however, withstand a very light frost which causes it to lose all its leaves and may produce a sharp decline in seed yield.

One ton of Jatropha Curcas seeds will produce up to 600 liters of bio-diesel with proper management.

Recommended planting rates of Jatropha Curcas are 2,000 / 2,500 plants per hectare (2.5 acres)

One person can professionally plant, manage and harvest 5-8 hectares of Jatropha Curcas.

30kg of Jatropha Curcas fruit can be harvested per person, per hour.

Jatropha Curcas seeds can produce 60% oil content depending on:

- Production capacity (genetics) of the plants
- Application of advanced pruning techniques
- The moisture level of the soil
- The nutrient level of the soil



- Application of foliar fertilizer 30 days before harvest
 - Stage of ripening at harvest
 - Use of high quality processing equipment
 - Processing completed within 24 hours of harvest
-

Jatropha Curcas Seeds

Our Superior high yielding Jatropha Curcas seeds will:

- Reach first harvest within 6 months with full production in their 5th year
- Have a life-span of 60 years, while producing seed for up to 50 years
- Be freshly harvested and professionally packed & shipped
- Exceed guaranteed 90% germination rate
- Produce fruit with high oil content (60%) - with proper management
- Have selected genetics from plants that have produced over 10 Tons of Oil per Hectare, per Year. (10 - 15kgs per tree at maturity)



Seed production of our high yielding Jatropha Curcas seeds

With correct management, soil and plant nutrition along with adequate moisture our seeds will achieve the following yields planted at 2,500 plants/Ha

- Year 1 - 3kg/tree
 - Year 2 - 6kg/tree
 - Year 3 - 9kg/tree
 - Year 4 - 10-12kg/tree
 - Year 5 - 10-15kg/tree
-

Above plant area is based on:

- Our minimum 90% germination rate
 - Planting 2,500 trees per hectare (2 X 2 meters spacing)
 - 1kg of our seed contains a minimum 1,100 seeds
-



Jatropha Curcas Propagation and Cultivation

The advantage of Jatropha Curcas seeds over Jatropha curcas cuttings

Jatropha Curcas grows readily from seeds or cuttings. However trees propagated from cuttings have a shorter productive lifespan and lower drought/disease resistance than plants propagated from seed.



Also, Jatropha Curcas trees produced from cuttings do not produce true taproots. Instead, they produce pseudo-taproots (surface roots) that may penetrate much less than half the depth of soil as taproots produced on trees grown from seed.

Achieving Outstanding Jatropha Curcas production Jatropha Curcas plants inoculated with MYCORRHIZAE will likely survive stressful conditions and give higher yields since the Funghi increases the volume of roots hence increasing drought tolerance of plants by facilitating the transport of moisture to and within the root system. The uptake of other nutrients essential for plant growth is also facilitated by mycorrhizae, and it has the ability to convert normally unavailable forms of Phosphorous to forms available for plant uptake.

Jatropha Plantation Carbon Credits

The addition of Mycohhizae fungi to the Jatropha plant assists the absorption of carbon into the soil and thereby assists in qualifying a Jatropha plantation for Carbon Credits.

ESTIMATED JATROPHA PLANTING COSTS

Cost of planting is approximately \$1,000 per hectare (including labor) if land is already cleared.
(More in USA)

Cost of annual running expenses including harvesting/Ha \$800 (more in USA)

Count on 1 person manually fully handling 5-8 Hectares

ACHIEVABLE JATROPHA YIELDS - Based on 2,500 plants per hectare

Beginning to yield after 6 months



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- 1st year seed yield/Ha 6,000kg
- 2nd year seed yield/Ha 12,000Kg
- 3rd year seed yield/Ha 18,000Kg
- 4th year seed yield/Ha 20,000Kg
- 5th+ year seed yield/Ha 24,000Kg

The plant has a known economic lifespan of over 40 years without replanting. There are many examples of trees over 60 years producing more than 120kg of seed, per year.

JATROPHA OIL / BIODIESEL PRODUCTION VALUE

1,000Kg of seed can produce (based on 50% oil recovery per seed):

- 500 Liters of Bio Diesel (est. USD\$500)
- 100 Liters of Glycerin (USD\$200)
- 400kg of Seed cake - Biomass (USD\$50)
- Total: USD\$750 per 1000kg seed

JATROPHA SEED PRODUCTION FOR FURTHER PLANTATIONS

These figures do not account for selling the seed for propagation of new plantations at USD\$2,500/tonne.

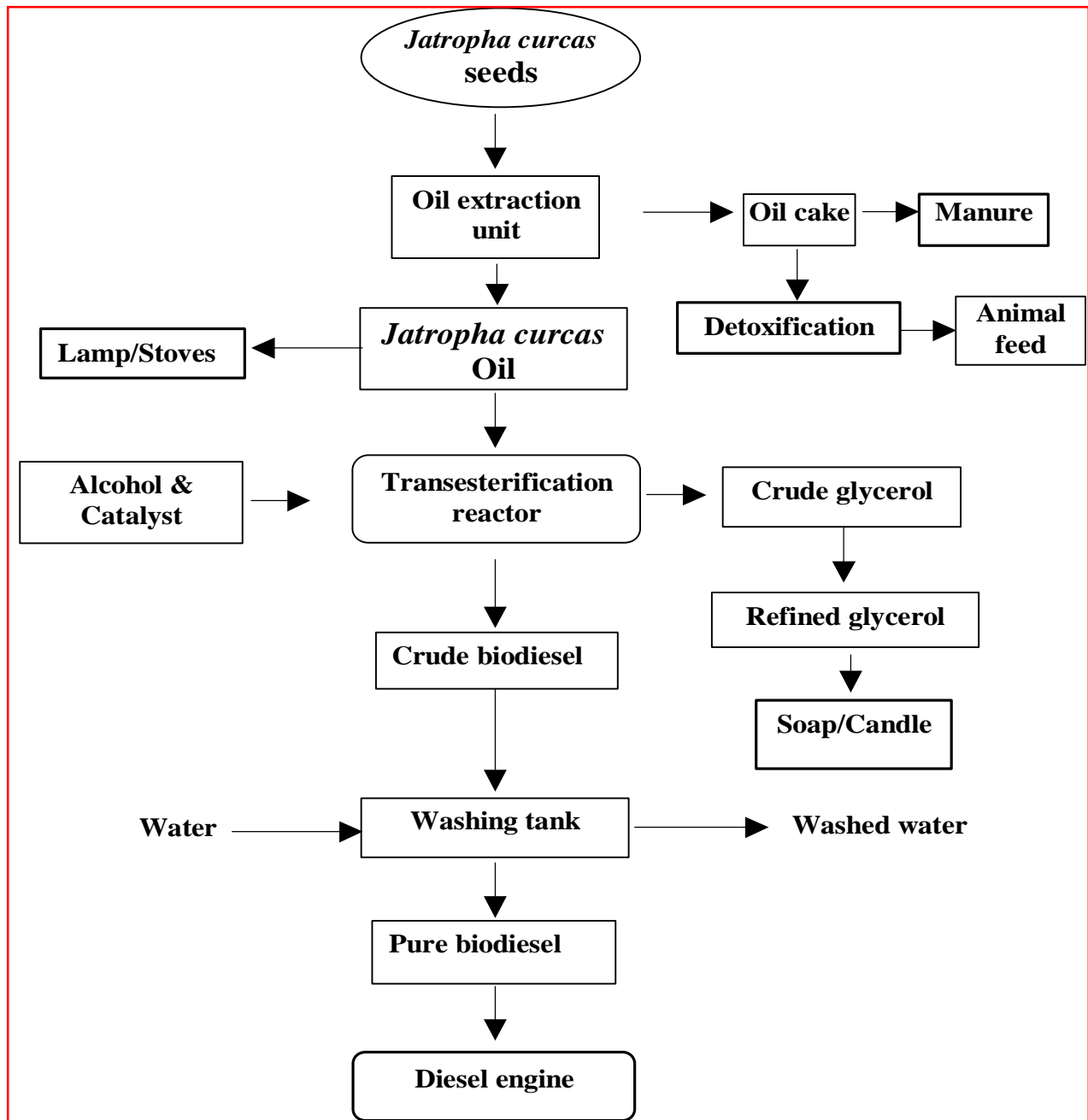
JATROPHA PLANTATION BIOMASS

At maturity you can sell 15 tonne /Ha of Biomass from leaves and pruning's for USD\$3,000ha/yr Alternatively, there is also the

potential of harvesting up to 70 tonne of Biomass/Ha from the whole plant annually.



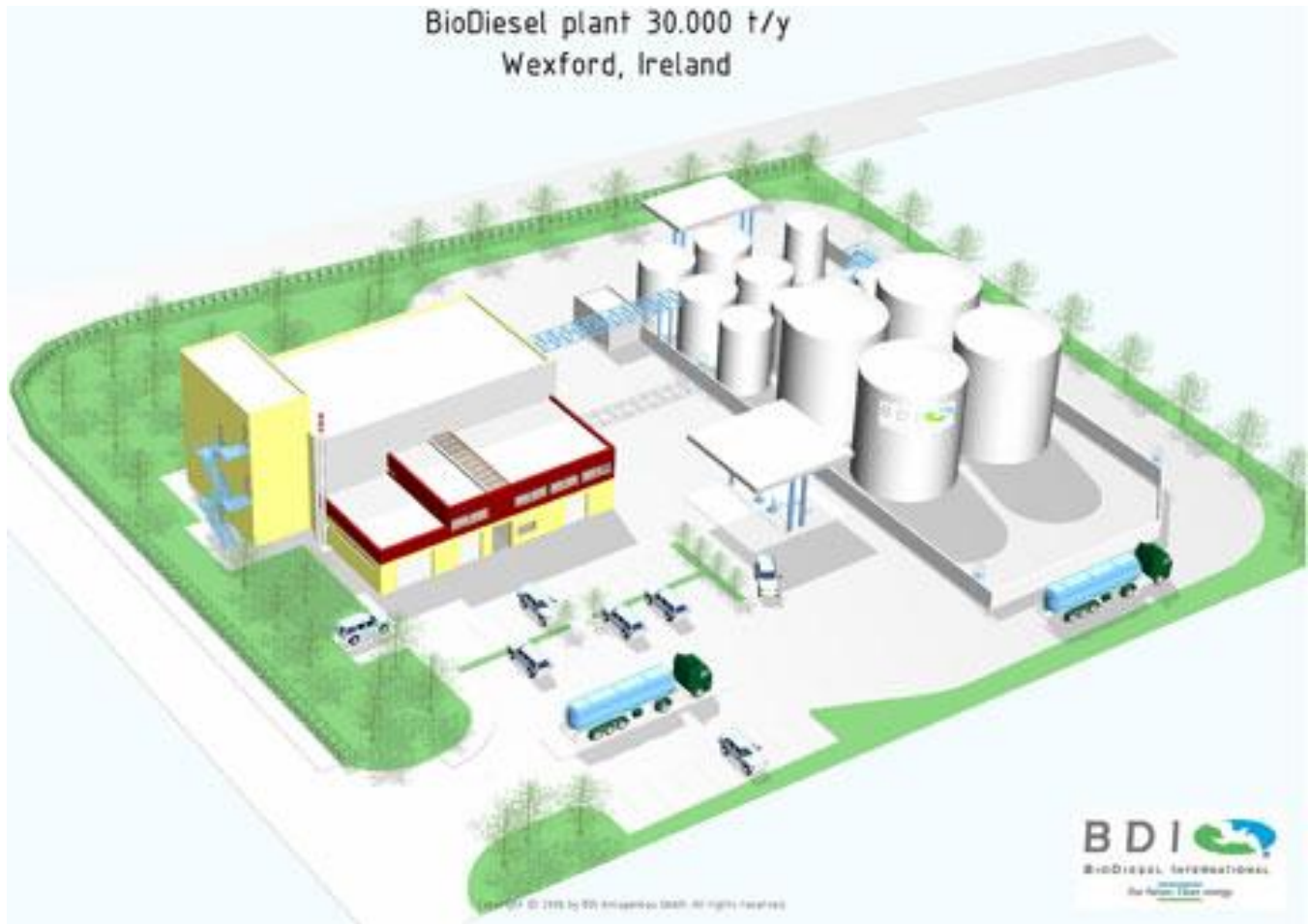
Jatropha Bio diesel Refinery



Turnkey Jatropha Plantation & Biodiesel Investment



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In addition to the operation of our own Jatropha plantations and consulting services we also offer full turnkey Jatropha Plantation establishment and specialized ongoing management services. Aimed at Investment groups we can lead the planning, development and ongoing management of a Jatropha plantation and related Bio-Diesel production facilities in an end-to-end manor.

- Turnkey Establishment & Management Of Jatropha Curcas Plantations Include:
- Initial Soil testing and audit
- Site Inspection / Assessment
- Nursery Establishment and Management



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- Plantation Establishment and Management (including application of advanced pruning techniques)



- Financial Feasibility study (capital, running costs, cash flow projections)
- Advanced Jatropha pruning / harvesting techniques
- Location and assessment of profitable biofuel investment projects
- Development of Bio-Diesel Refinery & Production facilities





Outlined below is an example financial / yield model achievable using our High yielding *Jatropha curcas* seeds as well as superior plantation establishment and management services.

Jatropha Oil in Comparison with Diesel Fuel

Parameter	Petroleum Diesel	Jatropha biodiesel
Energy content (MJ/kg)	42.6 - 45.0	39.6 - 41.8
Spec. weight (15/40 °C)	0.84 - 0.85	0.91 - 0.92
Solidifying point (°C)	-14.0	2.0
Flash point (°C)	80	110 - 240
Cetane value	47.8	51.0
Sulphure (%)	1.0 - 1.2	0.13

- 31 to 37 % of oil extracted from the seed.
- It can be used for any diesel engine without modification
- Selling treated seeds, and quality sapling



- Dark blue dye and wax can be produced from the bark of the plants
- Stem is used as a poor quality wood : fuel
- Leaves helps for wound dressing



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- Roots to make yellow dye
- Juice of the flowers and the stem has very good medicinal properties
- Pounded seeds for tanning
- Press Cake : Organic fertilizer and soil improver
- Extracted Oil as :Bio Diesel, Varnishes, Illuminants, Soap, Pest control and Medicinal for skin diseases, as purgative

Distribution and habitat

It is still uncertain where the centre of origin is, but it is believed to be Mexico and Central America. It has been introduced to Africa and Asia and is now cultivated worldwide. This highly drought-resistant species is adapted to arid and semi-arid conditions. The current distribution shows that introduction has been most successful in the drier regions of the tropics with annual rainfall of 300-1000 mm. It occurs mainly at lower altitudes (0-500 m) in areas with average annual temperatures well above 20°C but can grow at higher altitudes and tolerates slight frost. It grows on well-drained soils with good aeration and is well adapted to marginal soils with low nutrient content.



Biophysical limits

Altitude: 0-500 m, Mean annual temperature: 20-28 deg. C, Mean annual rainfall: 300-1000 mm or more.

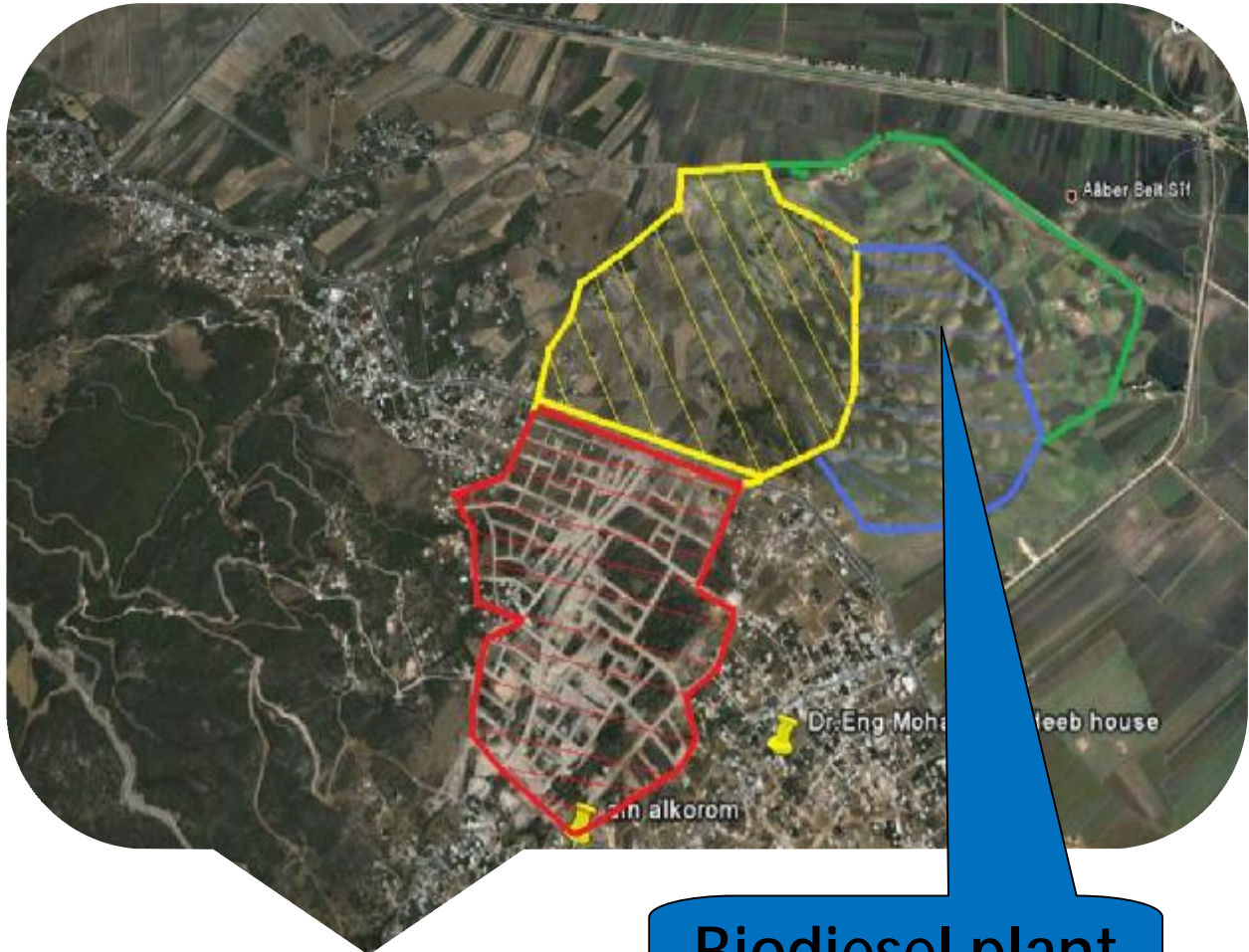
Soil type: Grows on well-drained soils with good aeration and is well adapted to marginal soils with low nutrient content. On heavy soils, root formation is reduced. Jatropha is a highly adaptable species, but its strength as a crop comes from its ability to grow on very poor and dry sites.





Feasibility study

Biodeisel plant as 30.000mt /year
Location : syria hamah –Alghab



Biodiesel plant

Location area :30.000m2.

Total inveseмент: 23.000.000USD

Annual product : 30.000mt from biodeisel .

1,000Kg of seed can produce (based on 50% oil recovery per seed):

500 Liters of Bio Diesel (est. USD\$500)

100 Liters of Glycerin (USD\$200)

400kg of Seed cake - Biomass (USD\$50)

Total: USD\$750 per 1000kg seed



Naanovo & ESI Syria project bio energy project

Total costs of 1ton from Jatropha seeds as 300\$

The final win in 1ton of seeds as 400\$USD,

annual : \$12.000.000USD

total costs of biodiesel plant :

1- **Equipment 20.000.000USD**

2- **Construction and civil works 1.000.000USD**

3- **Annual working costs :2.000.000USD**

Total: \$23.000.000 USD

Pay-back Period: 2

Carbon Credits: 20USD /TON

