
Jatropha, dream or reality
National Jatropha conference, Arusha 3-4 March 2011
www jatropha.pro
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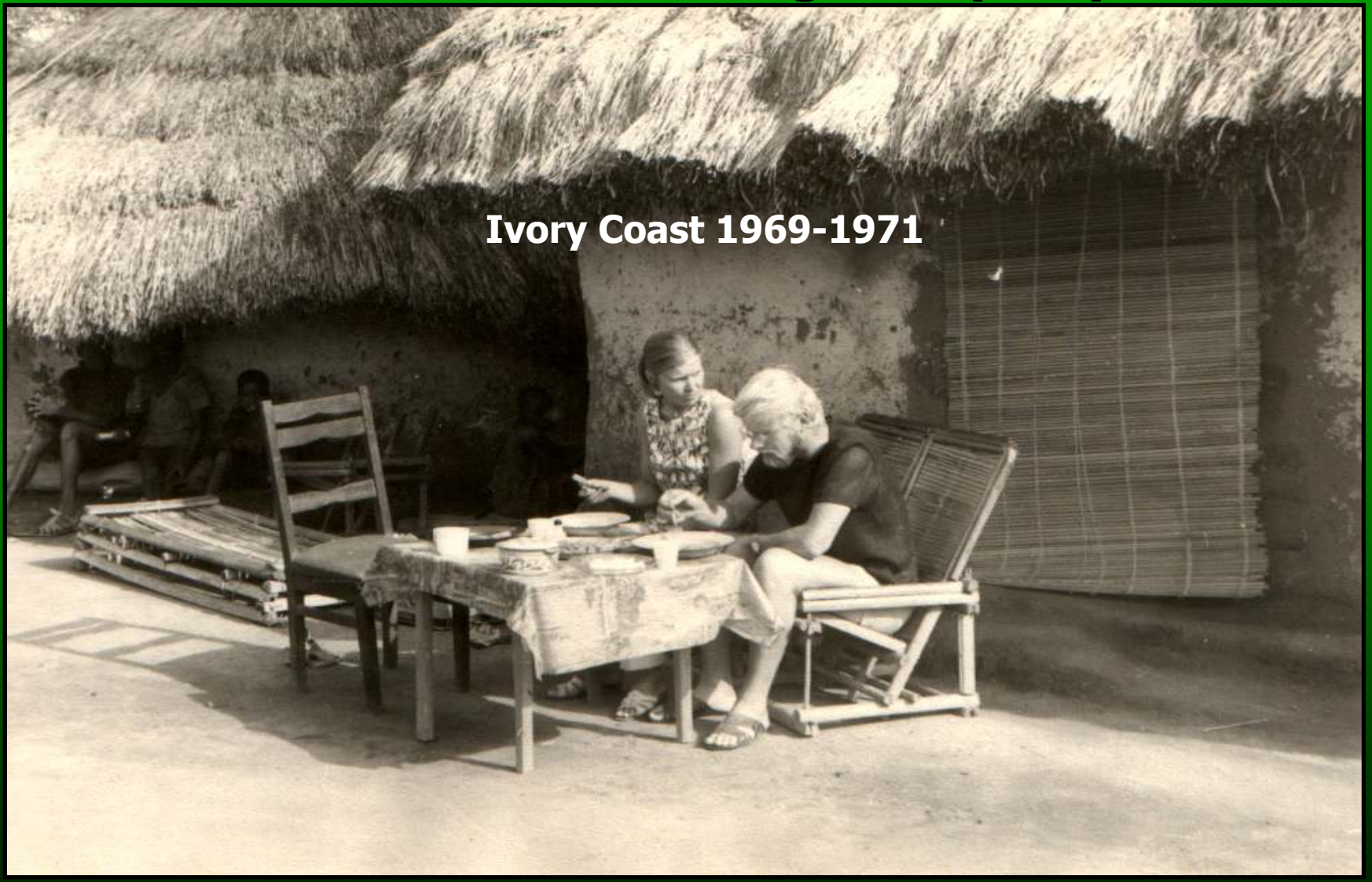
Introduction

1. About the author
2. Jatropha curcas in a global perspective
    1. What caused the Jatropha hype
    2. Now that the hype is over (?), what is left?
3. What will (could) be the Jatropha future world wide
4. What will (could) be the Jatropha future in East Africa
5. Conclusions and recommendations

Oldest horticultural college in NL. 1885

First married couple contracted by the Dutch Government for foreign aid (SNV)



Tanzanian experience
Horti Tengeru 1982-1985

First Lada Niva imported in Tanzania

Pepper trees planted in 1982, audited in 2009

First Jatropha experience ornamental *Jatropha podagrica*

First Jatropha curcas experience
D1 Agronomy director in Asia 2005-2008

1. About the author

1. **Jatropha curcas in a global perspective**
    1. **What caused the Jatropha hype**
    2. **Now that the hype is over (?), what is left?**

2. What will (could) be the Jatropha future world wide

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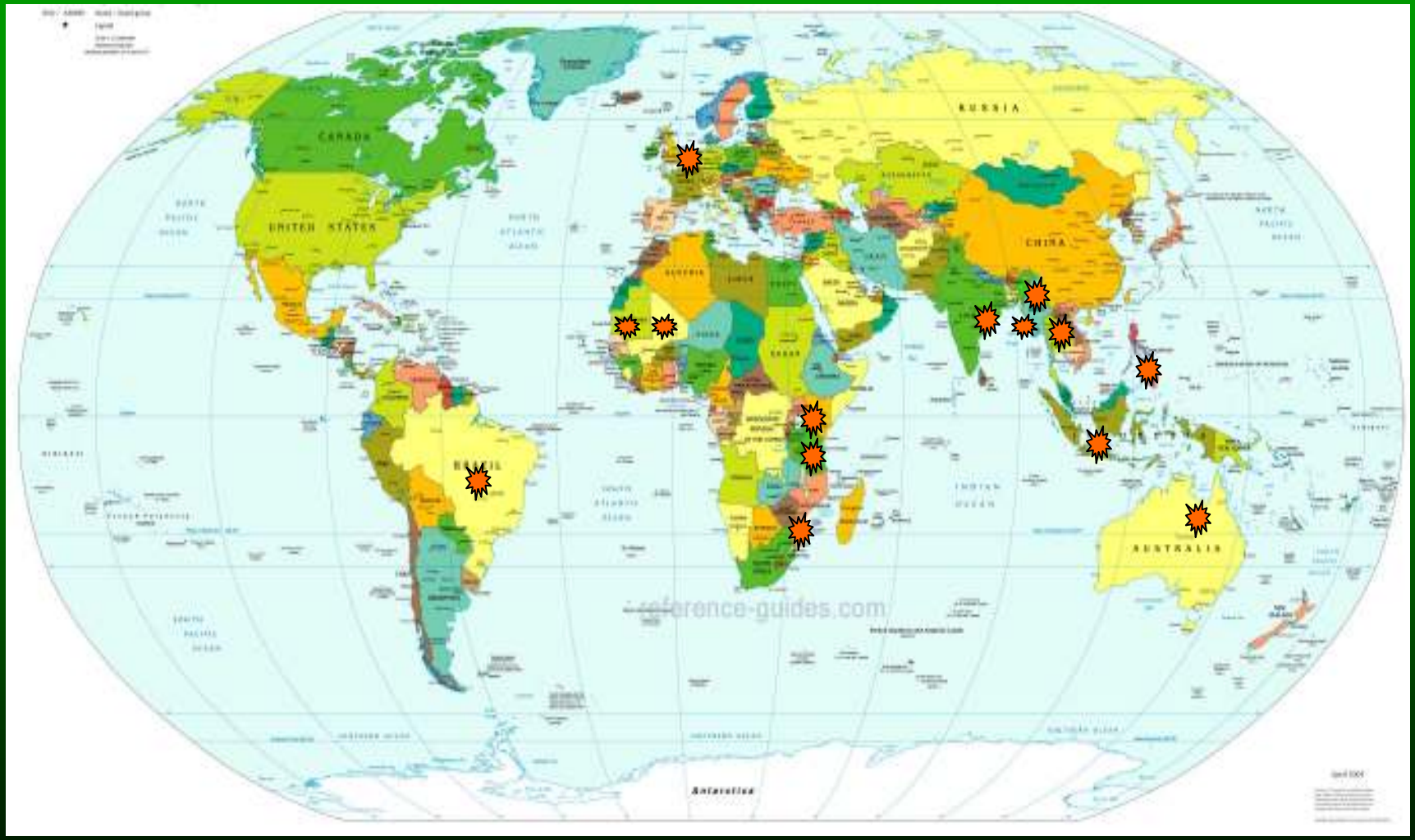
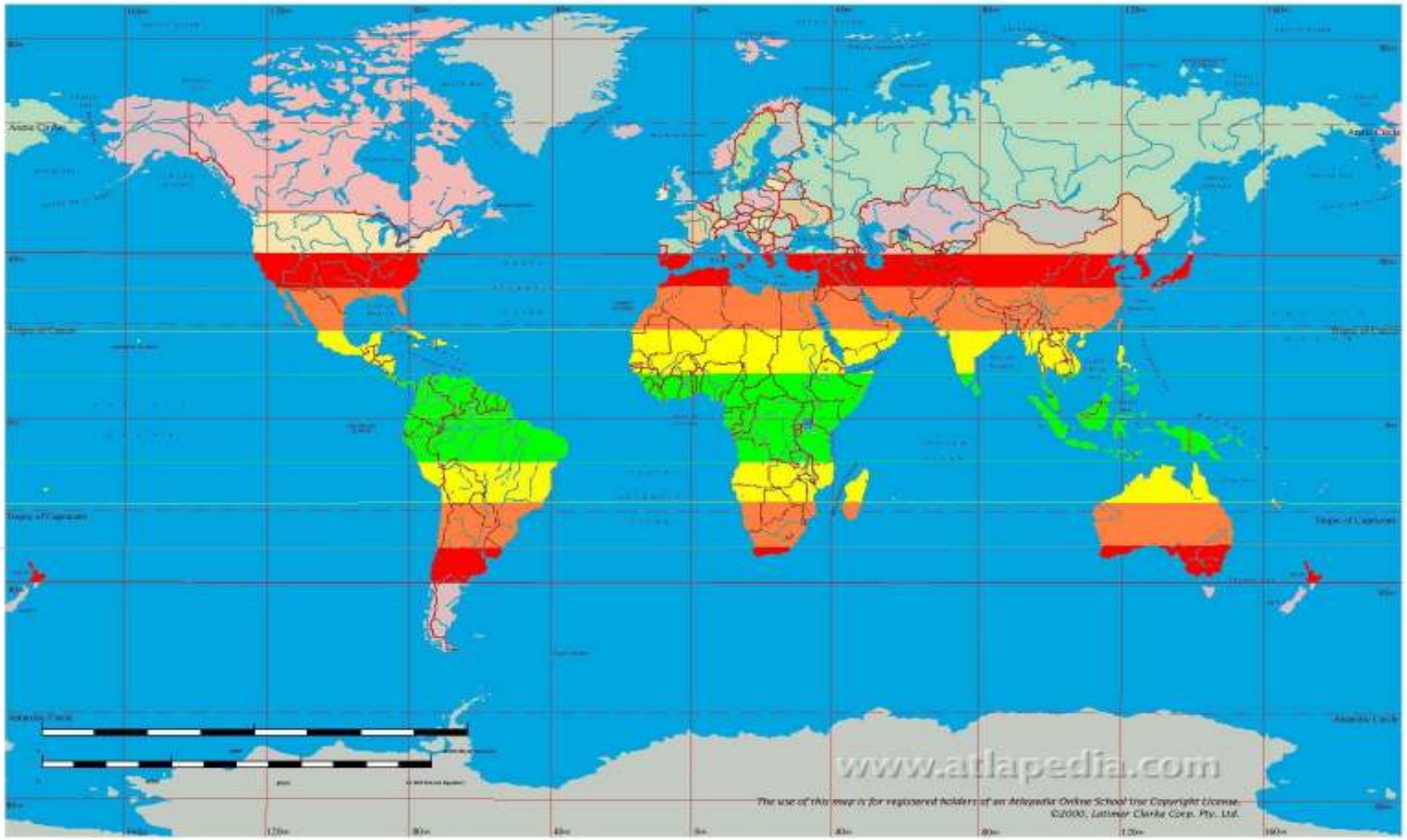
4. Conclusions and recommendations

International Jatropha experience 2005-2008



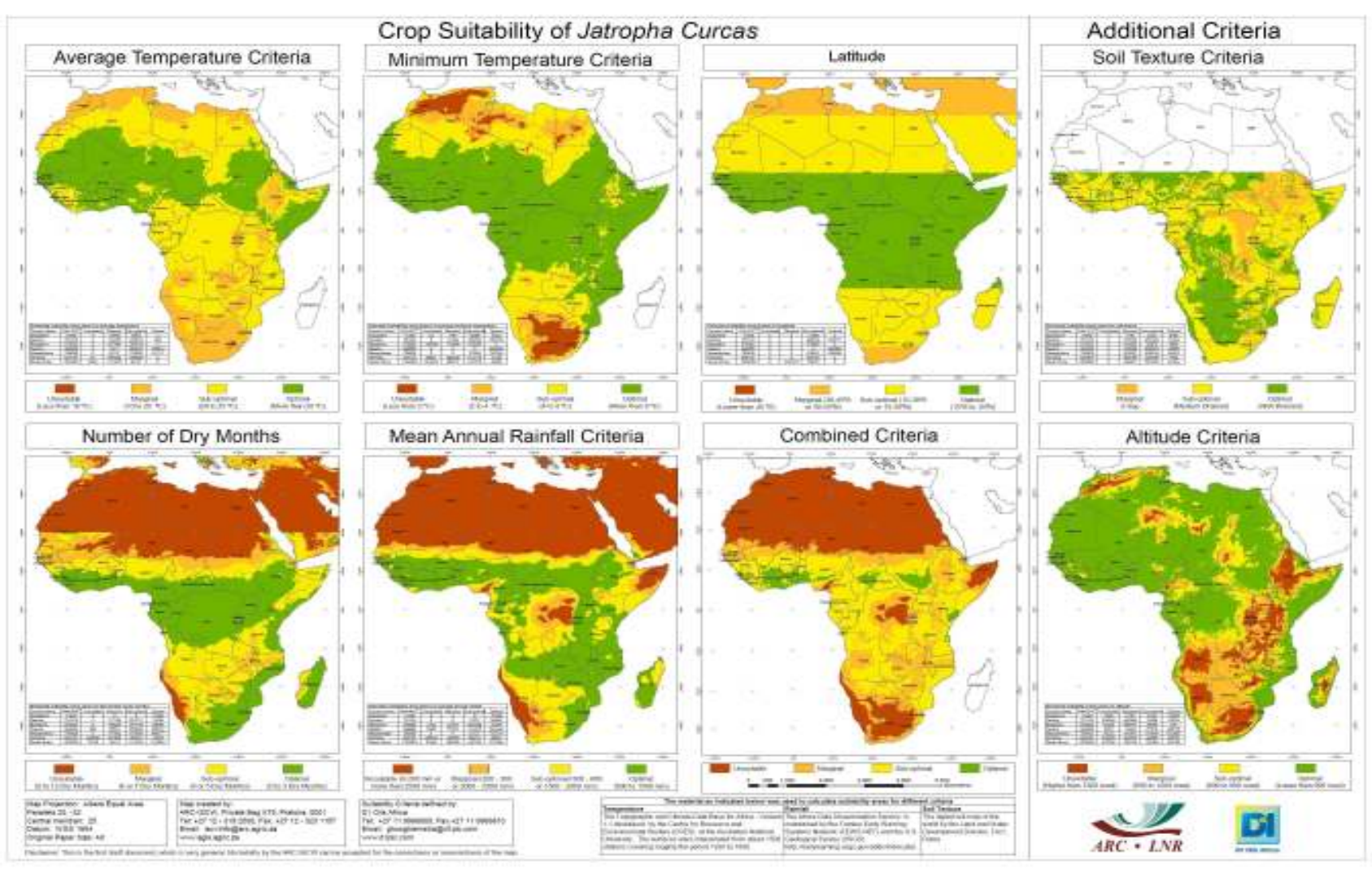
Potential Jatropha growing area



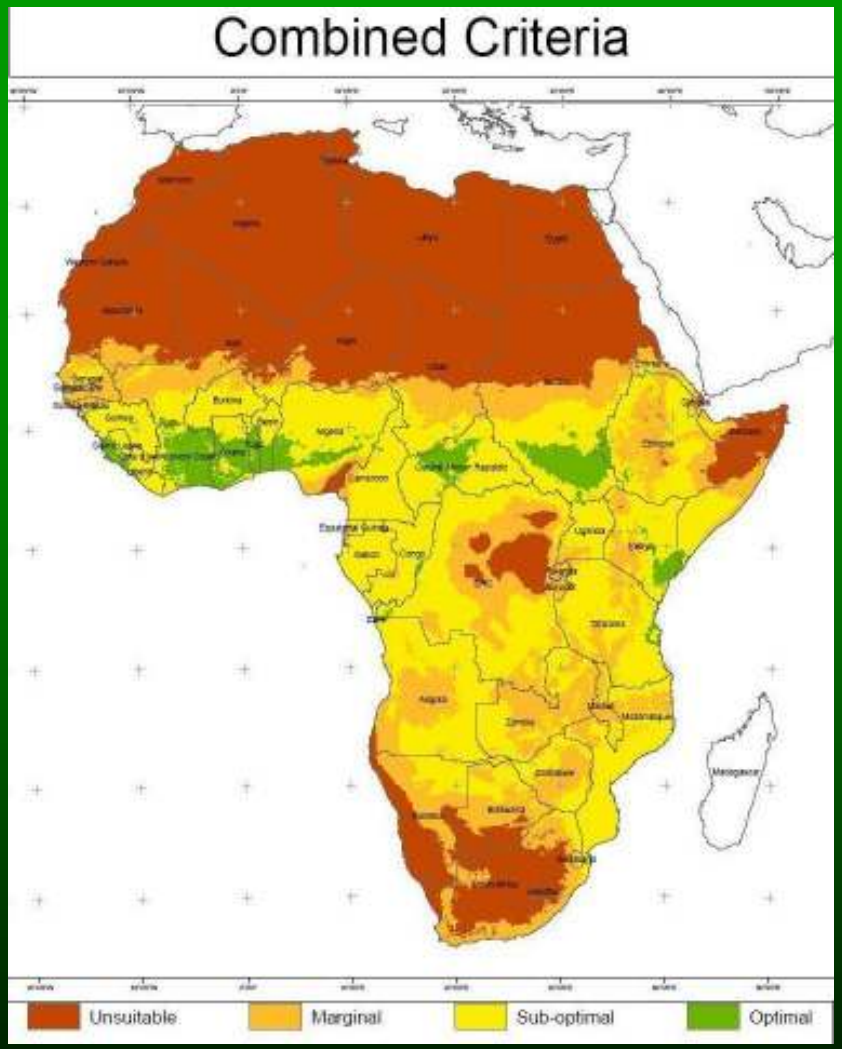
Criteria of potential Jatropha growing area

	Unsuitable	Marginal	Sub-optimal	Optimal
Average temperature °C	<10	>10<20	>20<25	>25
Minimum temperature °C	<2	>2<4	<4>9	>9
Latitude	<45 S	30-45 S/N	15-30 S/N	15S/N
Soil		Clay	Medium drained	Well drained
Altitude (mtr. above sl)	>1200	900-1200	600-900	<600
Rain mm	<200	<300>2000	600-2000	600-1500
Dry months	8-12	6-7	4-5	0-3

Potential Jatropha growing area



Potential Jatropha growing area



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Minimal conditions for a Jatropha growing area

The bad news with Jatropha is that no one has ever domesticated it.

The good news with Jatropha is that no one has ever domesticated it

Basic information about Jatropha

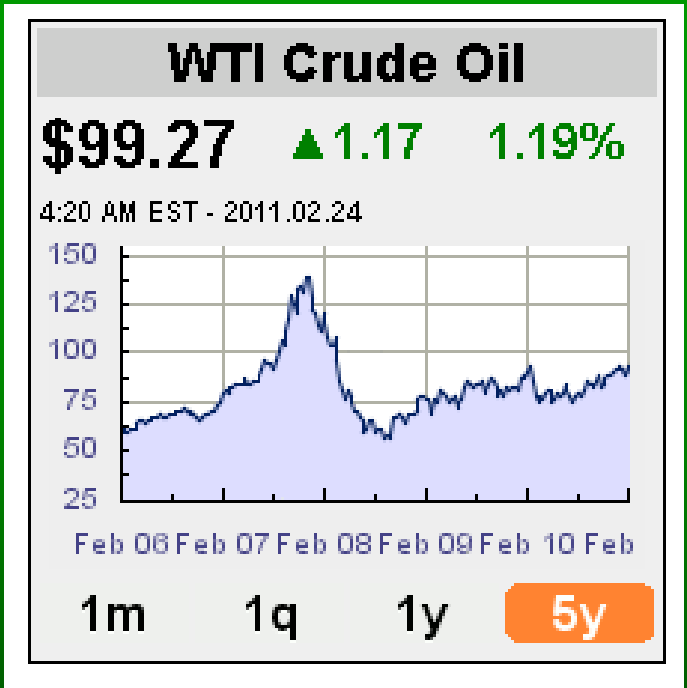
Jatropha is a wild tropical plant, originating from Central America
-requires minimum temperatures above 9 °C
-survives maximum temperatures above 40 °C
-prefers temp. conditions above 25 °C like most tropical plants
-is sensitive for altitude related low temperatures and cannot stand frost
-needs water and nutrients to grow like most plants
-will be attacked by all kind of diseases
-Needs a minimum of 600-1500 mm to grow
- survives high rainfall (> 3500)
- accepts any type of soil
-but does not like wet feet
-has a highly variable yield!!

What caused the Jatropha hype?

Jatropha is a wild tropical plant, originating from Central America

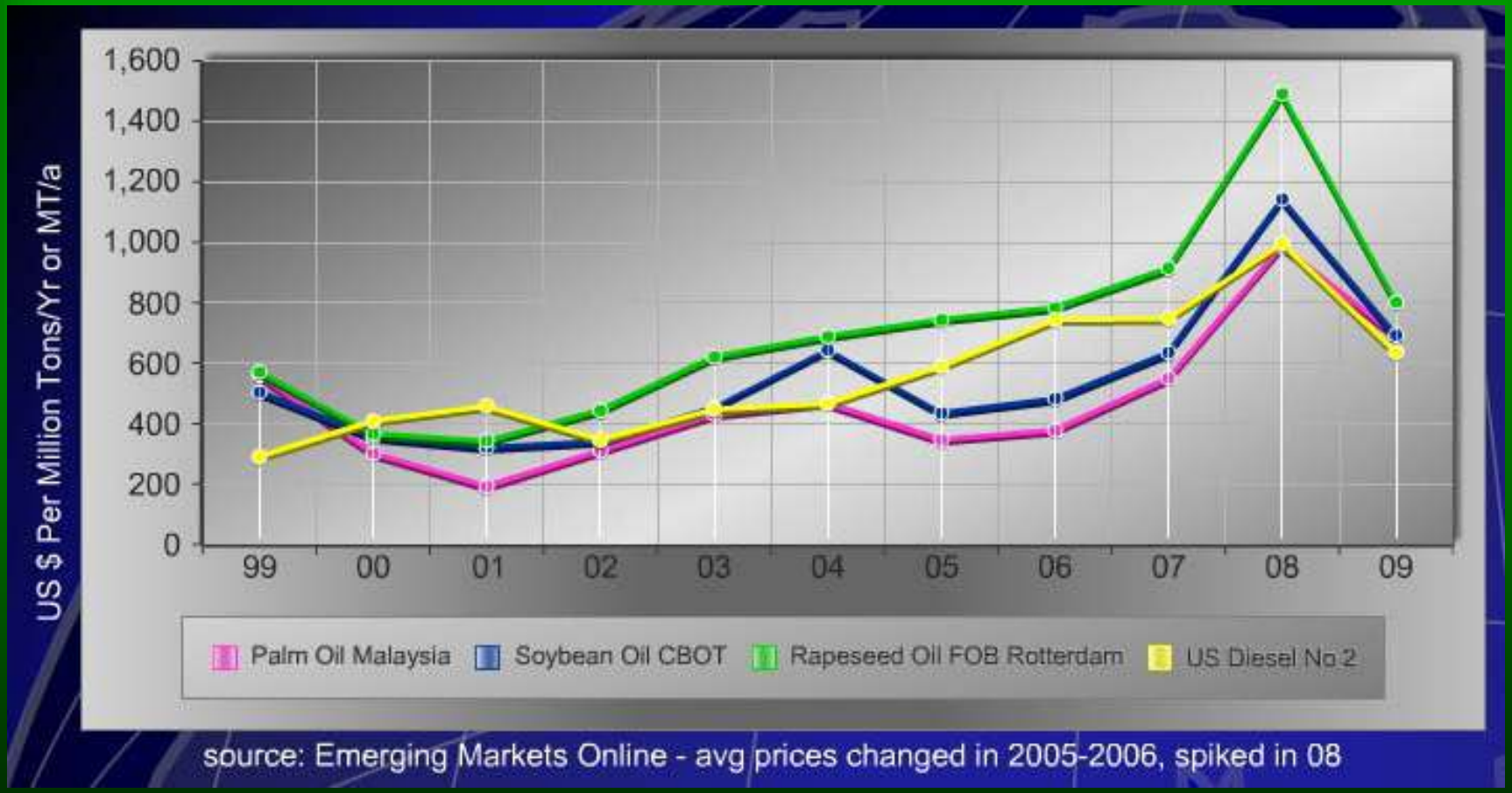
- **Jatropha curcas is a drought resistant shrub (bush, tree),grows on marginal soils and has seeds with an oil content of 20-40 %.**
- **Oil!**
- **The yield varies between 0.250 and 2.500 tonnes of oil per ha**
- **2.500 tonnes of oil per ha!**

What pushed the Jatropha hype?



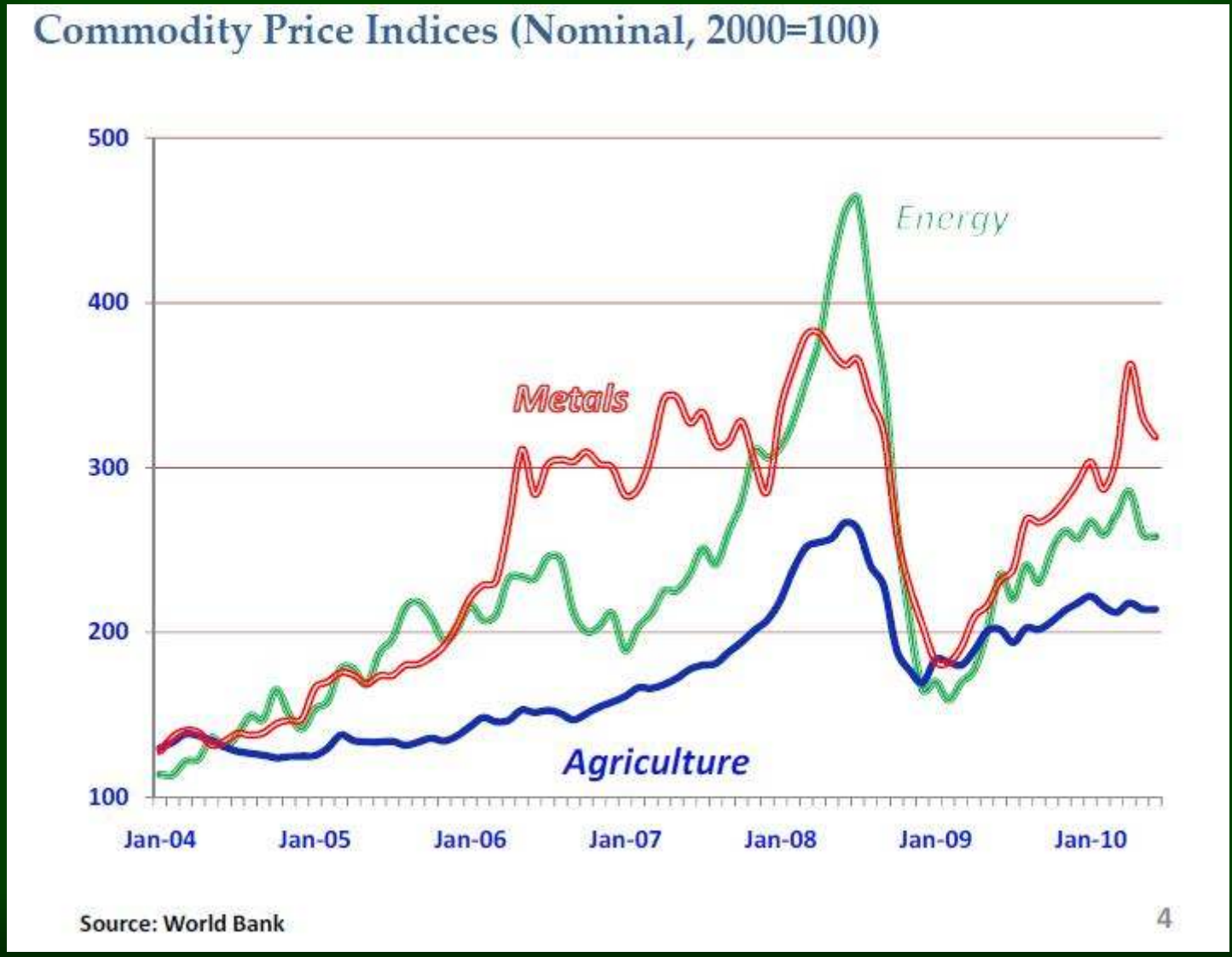
Rising fossil fuel prices, concerns over the increased CO2 and other greenhouse gas emissions, climate change, and concerns over the depletion of global oil reserves have all contributed to interest in bio-energy developments. (The BEFS analyses for Tanzania, FAO 2010)

What caused the Jatropha hype?

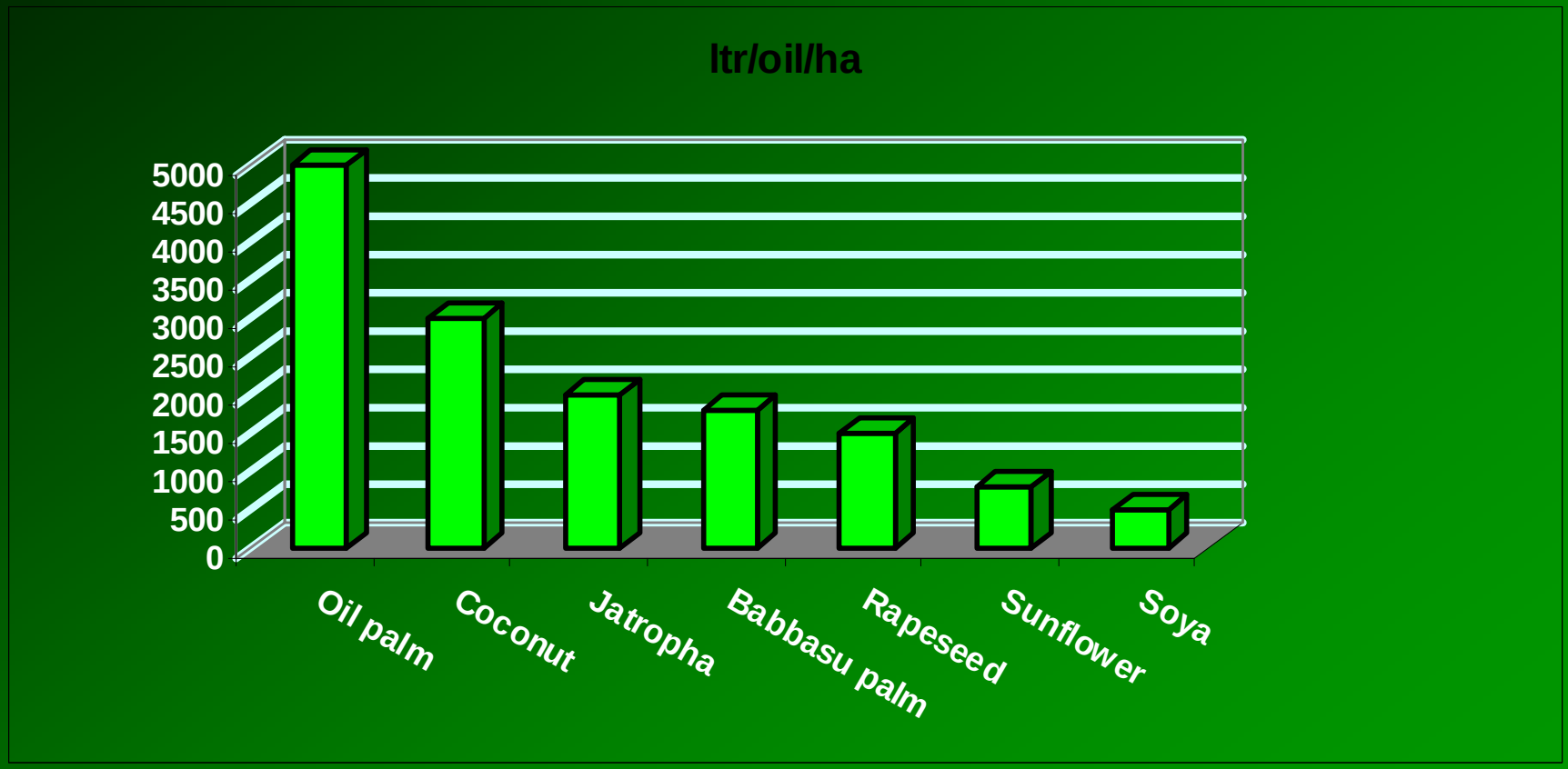


Food follows Fuel

Speculation!



What helped the Jatropha hype?

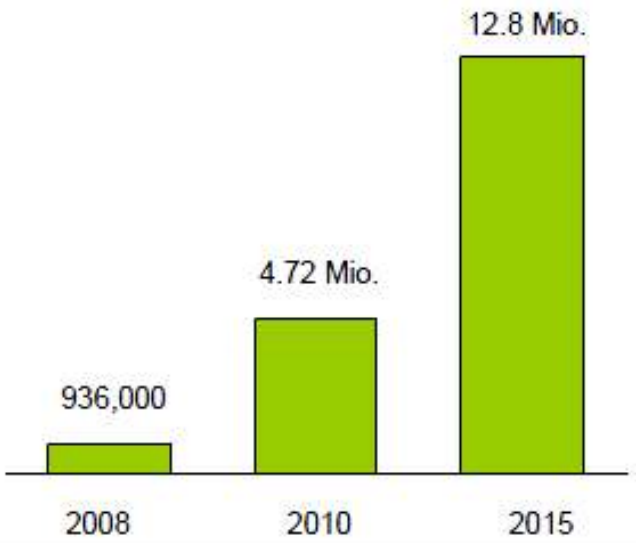


What more caused the Jatropha hype?

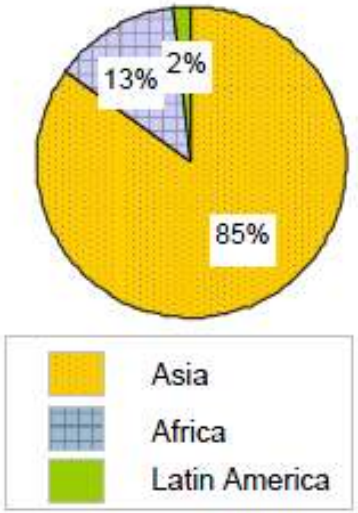
1 Management Summary (5)

GEXSI

Scale of Jatropha plantations 2008-2015 (ha)



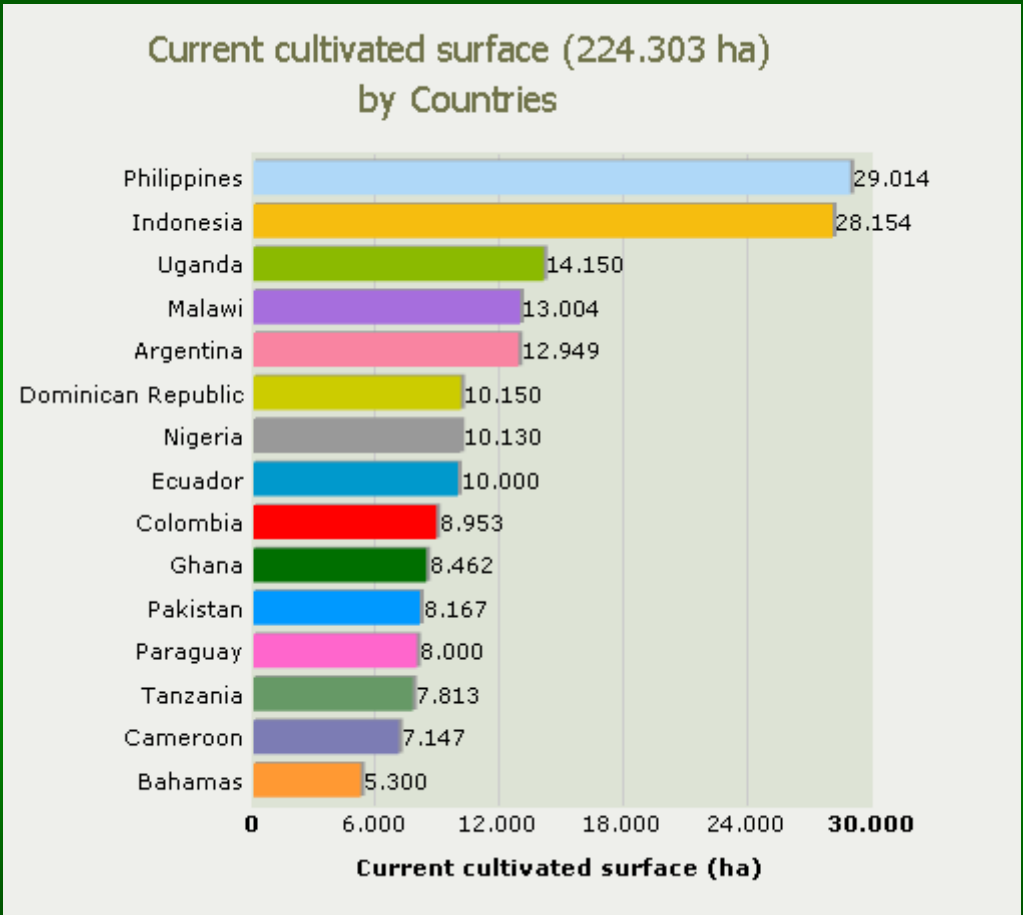
Distribution of Jatropha plantations 2008 (ha)



Comments

An enormous growth is predicted by experts to the Jatropha industry. 1-2 million hectares are expected to be planted annually in the next years all over the world.

What caused the Jatropha hype?



?
Where is :
Brazil
India
Zambia
Mozambique
Kenya
Namibia
Malaysia
China
Thailand
Cambodia
Laos
Vietnam

Actual? info from www.jatrophabook.com

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Verification of existing Jatropha area

- Visits to
- **China, Laos, Cambodia, Thailand, Philippines, Malaysia, Indonesia, India, South Africa, Mali, Senegal, Tanzania, Brazil.**

- Contacts with
- **Mike Lu, president of the Brazilian association of Jatropha producers.**
- **Virgilio Vilancio, program leader of the Jatropha program at the University of Los Baños in the Philippines.**
- **Vincent Volkaert, Business director of Quinvita (formerly D1plantscience)**
- **Dr. Siva, Malaysian Agricultural Research and Development Institute (MARDI)**
- **Dr. Penjit Srinophakun of the Katesart University in Bangkok, Thailand.**

Actual worldwide Jatropha plantings January 2011- 350K ha

Country	Plant	Outfarm	Total
India	5350.0	101000.	106350.
Madagascar ??	58652.	1550.0	60202.0
Brazil	24080.	26000.0	50080.0
Indonesia	12807.	7233.3	20040.8
Myanmar	5000.0	10000.0	15000.0
Uganda	650.0	9150.0	9800.0
China ??	8000.0	2000.0	10000.0
Argentina	5000.0	1000.0	6000.0
Tanzania	3366.0	2610.0	5976.0
Thailand	5000.0	500.0	5500.0
Zambia	1600.0	4380.0	5980.0
Mexico	5000.0		5000.0
Mali		4500.0	4500.0
Philippines ??	1604.0	2350.0	3954.0
Mozambique	3870.0		3870.0
Ethiopia	500.0	3000.0	3500.0
Malawi	300.0	3000.0	3300.0
Ghana	1250.0	1250.0	2500.0
Laos	500.0	1700.0	2200.0
Guatemala	500.0	1550.0	2050.0
Honduras	1024.0	900.0	1924.0

Malaysia	520.0	900.0	1420.0
Egypt	10.0	1000.0	1010.0
Bourkina Faso		1000.0	1000.0
Peru	500.0	500.0	1000.0
Burundi	400.0		400.0
Pakistan ??	215.0		215.0
Kenya	210.0		210.0
Belize	200.0		200.0
Nicaragua	200.0		200.0
Vietnam	200.0		200.0
El Salvador	100.0		100.0
Senegal	75.0		75.0
Sri Lanka	40.0		40.0
Cameroon	20.0		20.0
Morocco	15.0		15.0
Ivory coast	10.0		10.0
Congo DR	5.0		5.0
Niger	2.0		2.0
Haiti ??	0.0	0.0	0.0
Namibia ??			0.0
Total	146775.	187073.	333848.

Actual worldwide Jatropha plantings January 2011- 350K ha

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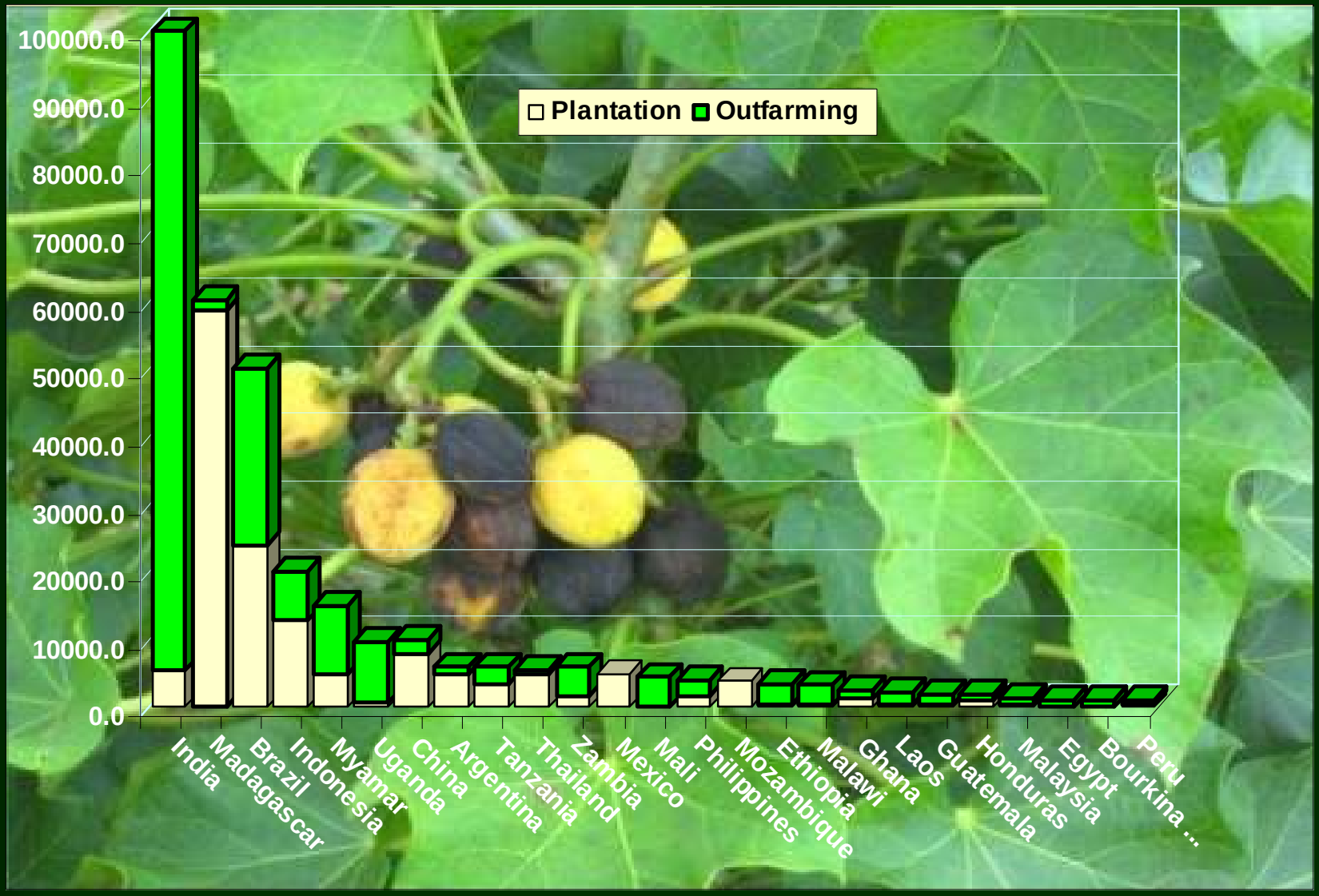
Actual worldwide Jatropha plantings January 2011- 350K ha



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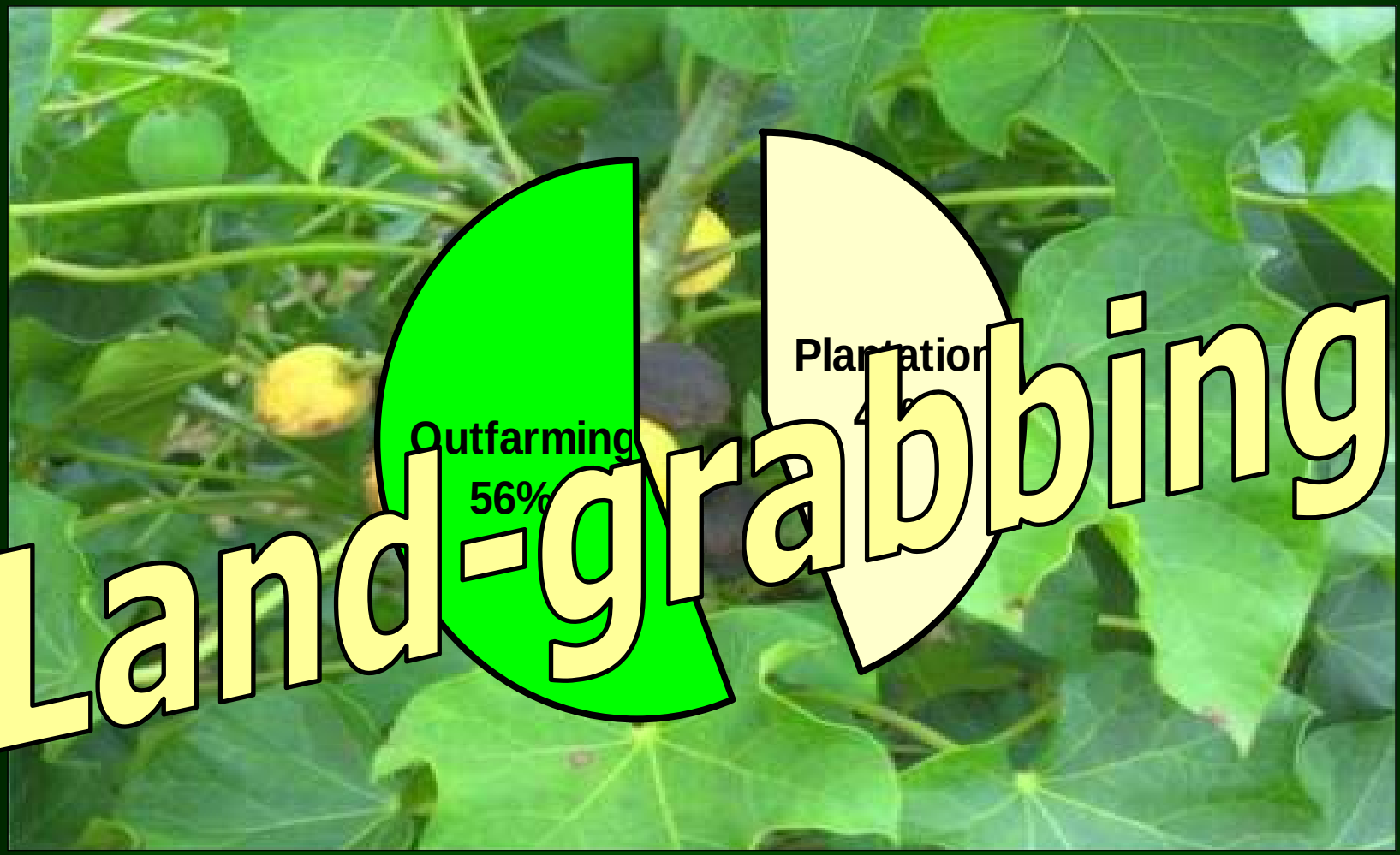
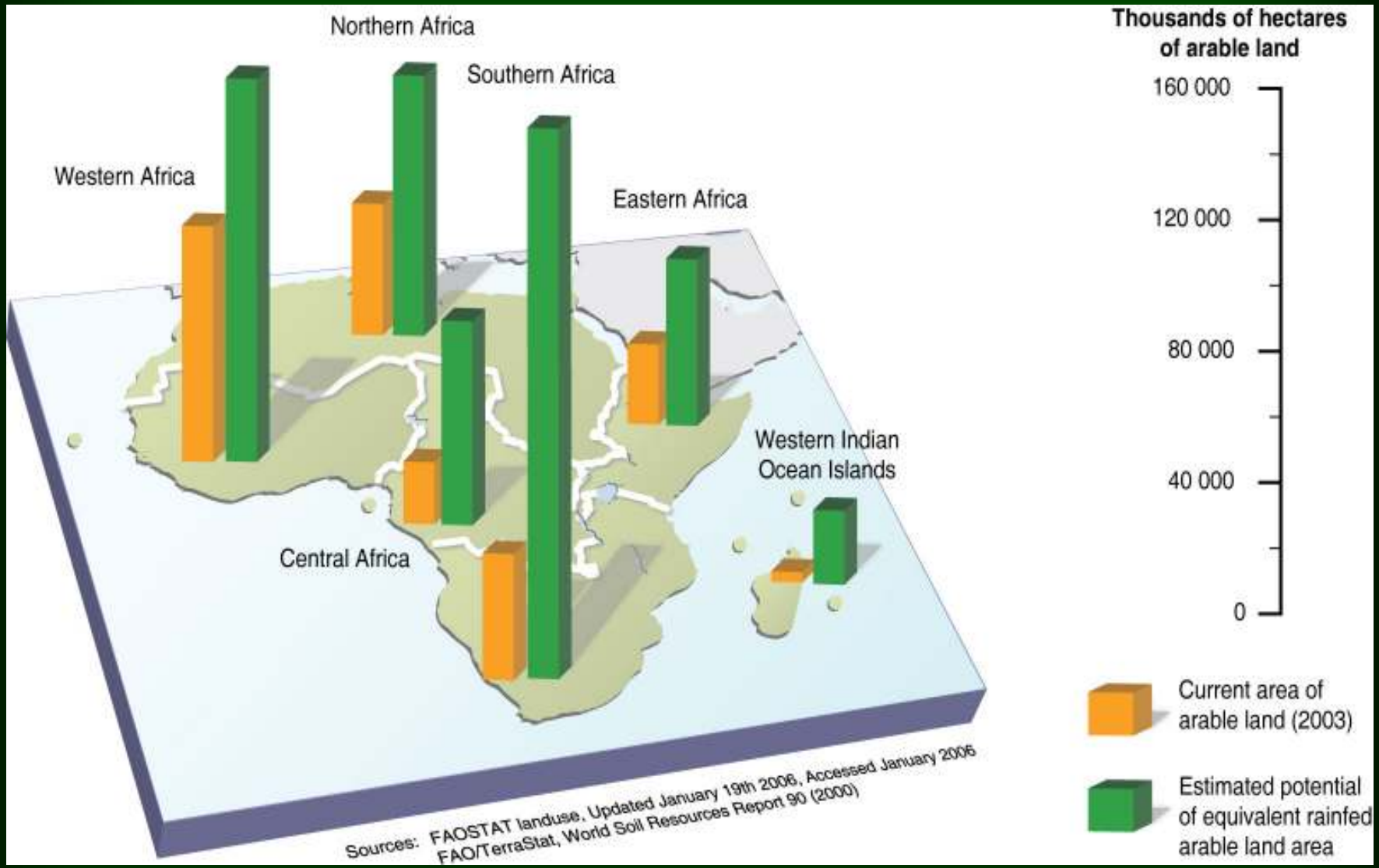
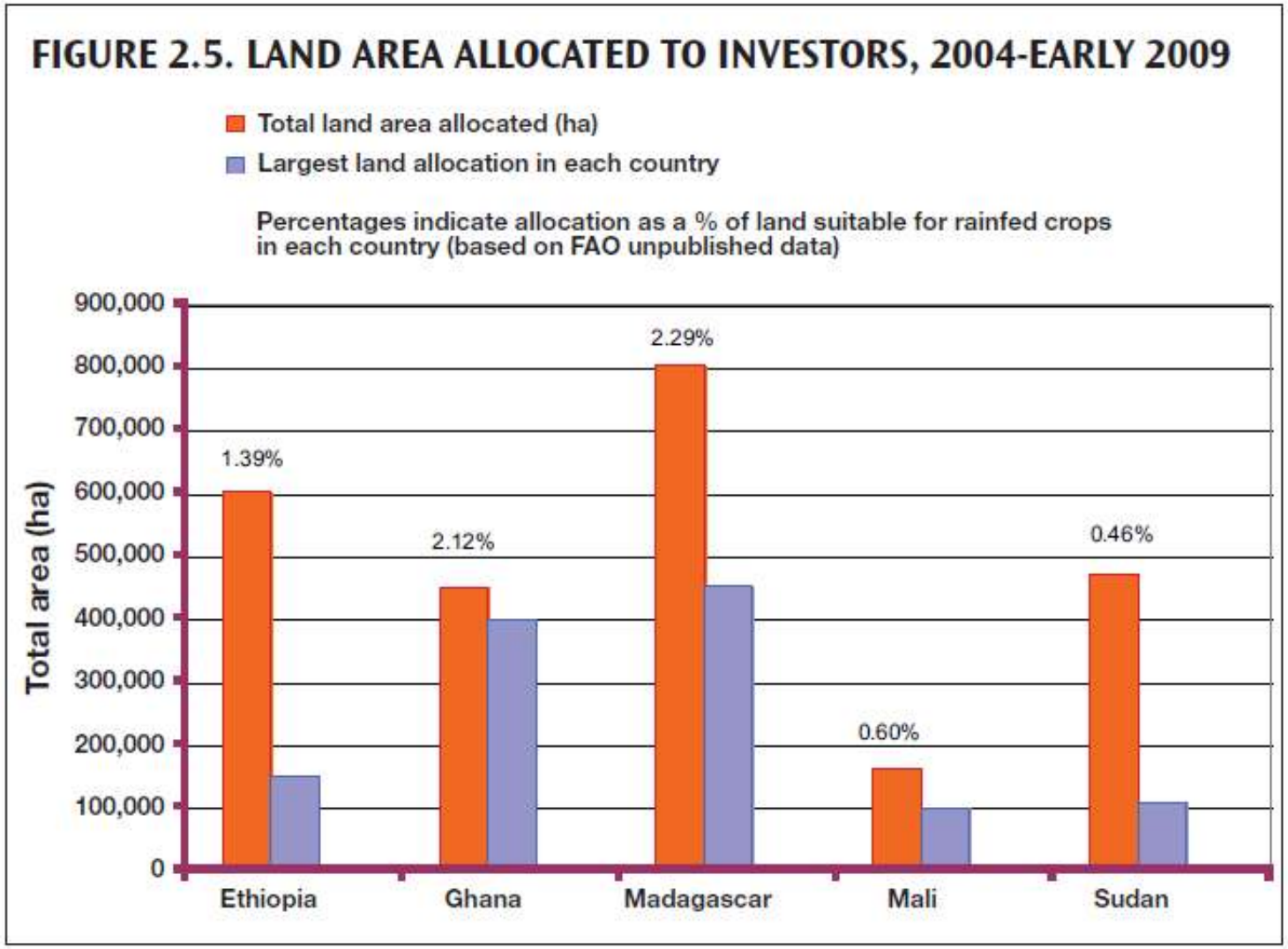
Worldwide % plantation versus outfarming 350K ha



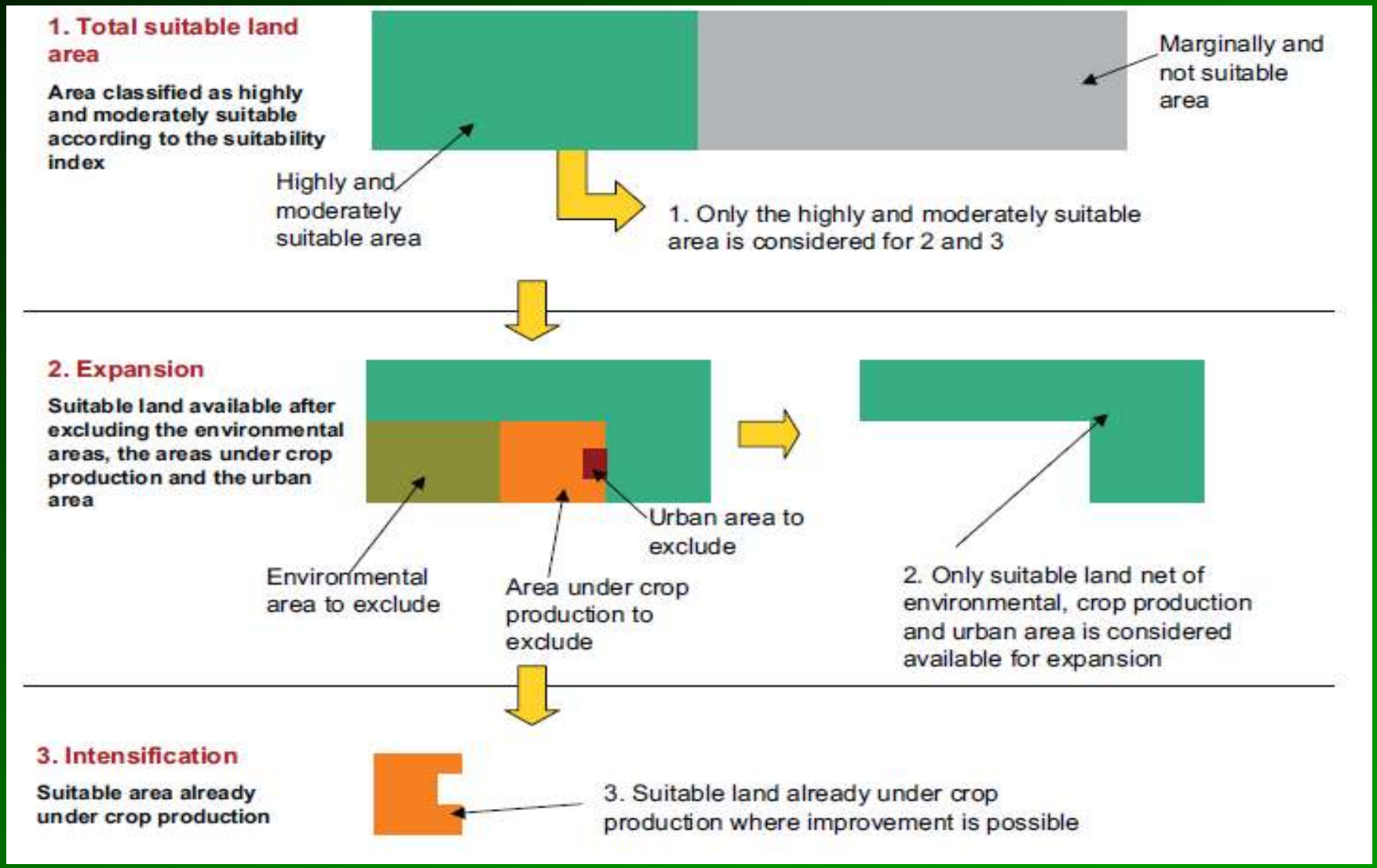
Available potential of rain-fed arable land in Africa



% land allocated to investors (FAO)



Potential of rain-fed arable land in Tanzania



(The BEFS analyses for Tanzania, FAO 2010)

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1. Conclusions and recommendations

Global perspective for Jatropha curcas products

Jatropha products

- PPO
- Seedcake
- CO2

Jatropha markets

Local	Export
X	**X**
X	**X***
	X

*detoxified

Global perspective for Jatropha curcas products

Jatropha products

- PPO

Adapted diesel engines

Energy production (heat and electricity)

Biodiesel

Soap

Jatropha markets

Local	Export
X	**X**
X	
X	**-**
X	**X**

Global perspective for Jatropha curcas products

Jatropha products

- Seedcake

  Fertilizer

  Bio Gaz-fertilizer

  Briquettes

Jatropha markets

Local	Export
X	
X	
X	

Global perspective for Jatropha curcas products

Jatropha products

CO2

1 carbon credit =

1 MT CO2= €5

(Actually between 0.5 and 10)

1 ha Jatropha (1600, 2x2) absorbs about 10 MT Carbon

= 10 x 5 =

€ 50 per ha/year

- **http://www.jatropha.pro/PDF%20bestanden/southpole.pdf**

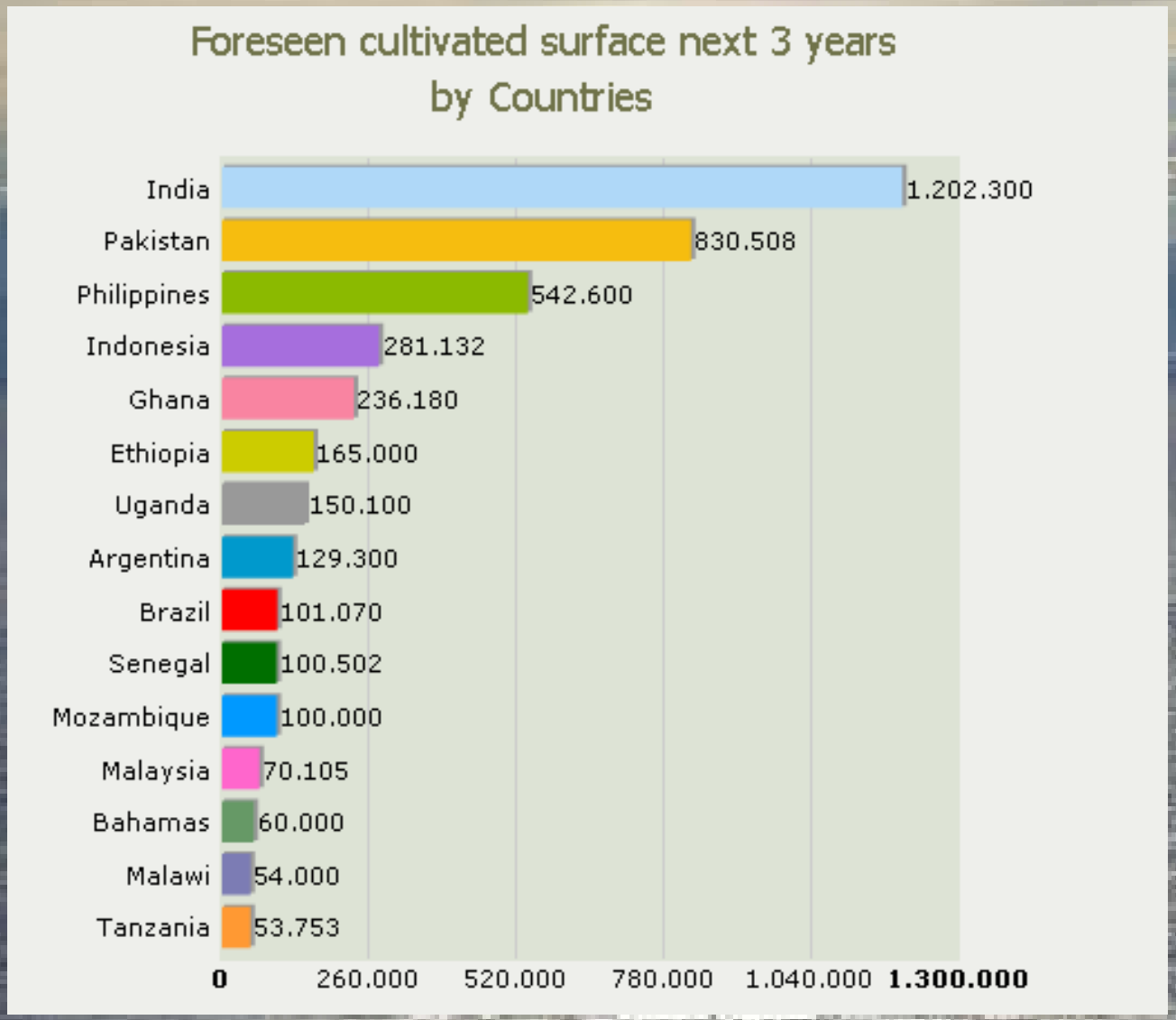
Jatropha markets

Local	Export
	x

Global perspective for Jatropha curcas products

Actual worldwide jatropha oil production on
350.000 ha x 3 mt seed per ha =
1.050.000 mt seed.
With 28% oil extraction there will be roughly
300.000 mt of Jatropha oil
3 tankers of 100.000 mt/year!

Global perspective for Jatropha curcas products



2015??

X 10

≈1.000.000 mt

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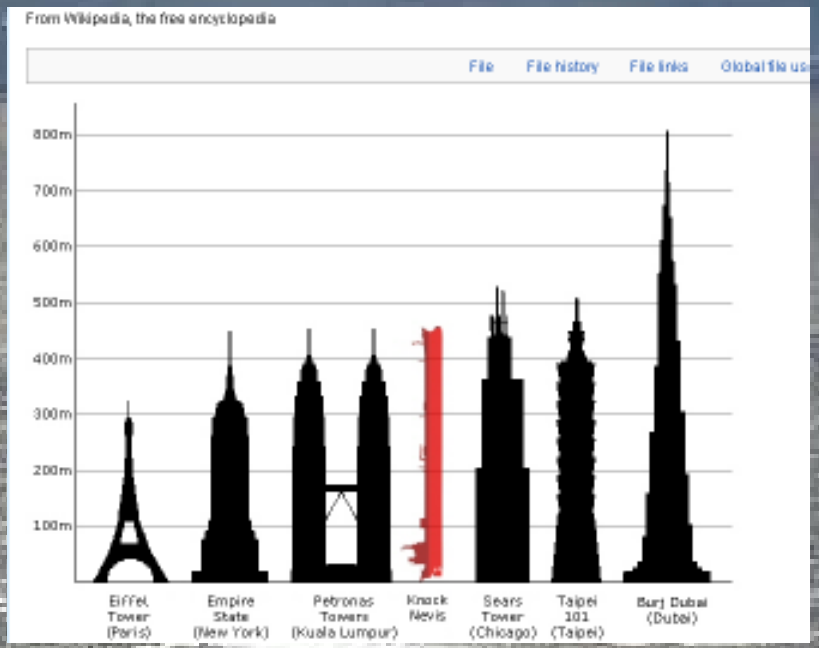
Actual? info from www.jatrophabook.com

Global perspective for Jatropha curcas products

2015??

X 20.000

Shipped crude oil 2.000.000.000 mt/year



Seawise Giant 500.000 + mt

X 10

Jatropha oil 1.000.000 mt/year

0.05 %

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Global perspective for Jatropha curcas products

Carrier	Aircraft	Partners	Date	Alt Fuel	Blend
Virgin atlantic	B747-400	Boeing, GE Aviation	23 Feb 2008	Coconut & Babassu	20% one engine
AIR NEW ZEALAND	B747-400	Boeing, Rolls-Royce	30 Dec 2008	Jatropha	50% one engine
Continental Airlines	B737-800	Boeing, GE Aviation, CFM, Honeywell UOP	7 Jan 2009	Algae and Jatropha	50% one engine
JAL	B747-300	Boeing, Pratt & Whitney, Honeywell UOP	30 Jan 2009	Camelina, Jatropha, Algae blend	50% one engine
QATAR AIRWAYS القطرية	A340-600	Airbus, Shell	12 Oct 2009	Gas to liquid (not biofuel)	50% four engines
KLM	B747-400	GE, Honeywell UOP	23 Nov 2009	Camelina	50% one engine
UNITED	A319	Rentech	30 April 2010	Gas to liquid (not biofuel)	40% two engines

Aviation consumes 2% of all fossil fuels burnt. In 2005 this was about 200.000.000 Mt

Global perspective for Jatropha curcas products

•Since air transport is a relatively "compact" industry, it would be logical for the air transport industry to be one of the first sectors within the transport industry to take the lead by using alternative fuels.

•However, the challenge is that aviation's demand may not be

•sufficient to justify the important investments required. ATAG report 2006

In April 2011, Lufthansa is to begin a six-month trial with an Airbus A321 on scheduled commercial flights on the Hamburg-Frankfurt-Hamburg route.

Lufthansa is currently making intensive preparations for the practical tests. Aside from the actual research project, the acquisition of biofuel in sufficient volume and the complex logistics it involves is proving a challenge in the run-up to the trial

Aviation only consumes 2% of all fossil fuels burnt. In 2005 this was about 200.000.000 Mt

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3. What will (could) be the Jatropha future in Tanzania?

1. Conclusions and recommendations

Feasibility study fair trade Jatropha

- **Max Havelaar fair trade**
- **Eneco Energy**
- **ICCO**

KCU

- **Kagera Co-operative Union**

Max Havelaar Foundation Feasibility study on 3 locations

Bukoba

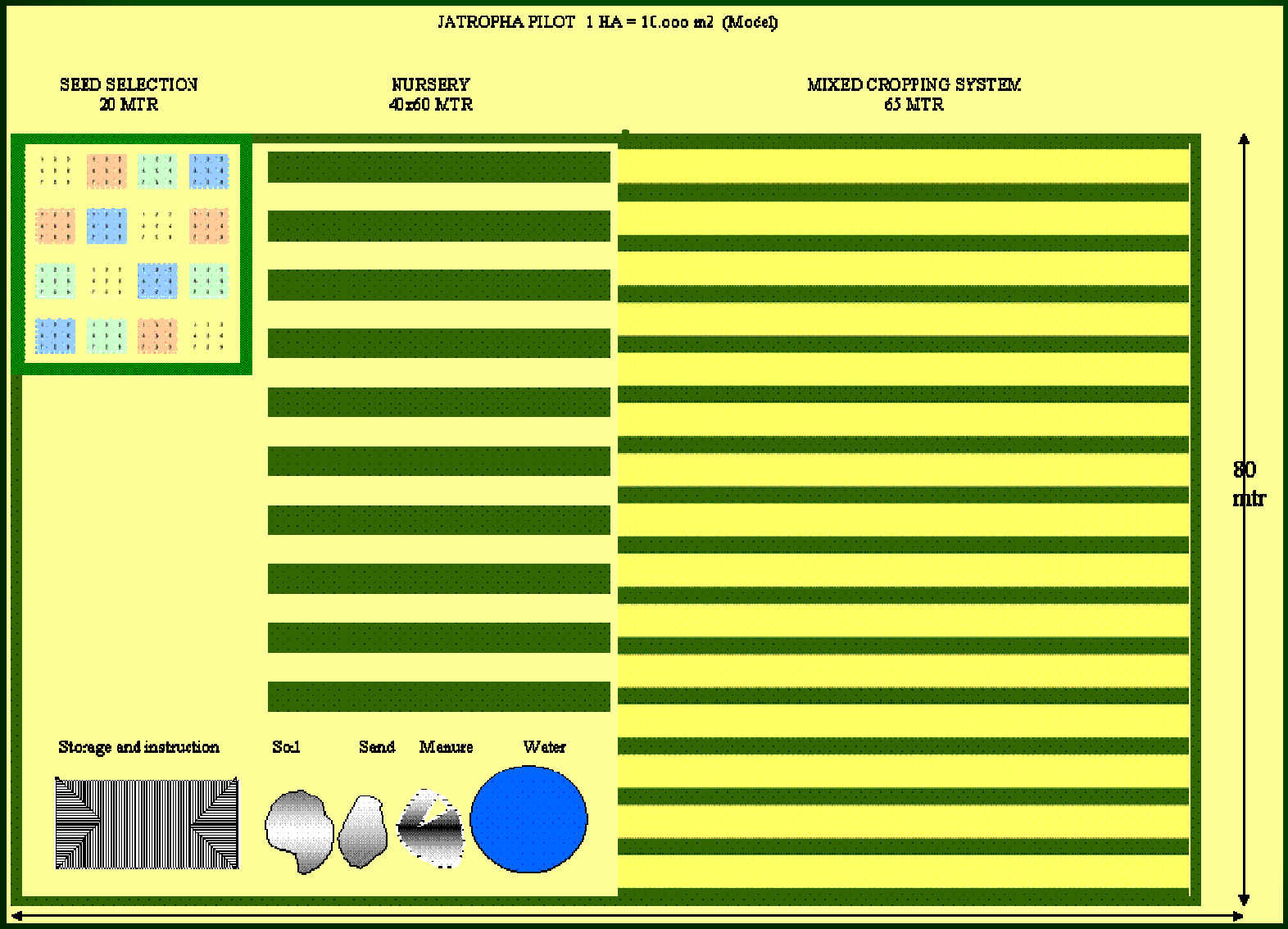
(Ruhanga)

Kilimanjaro

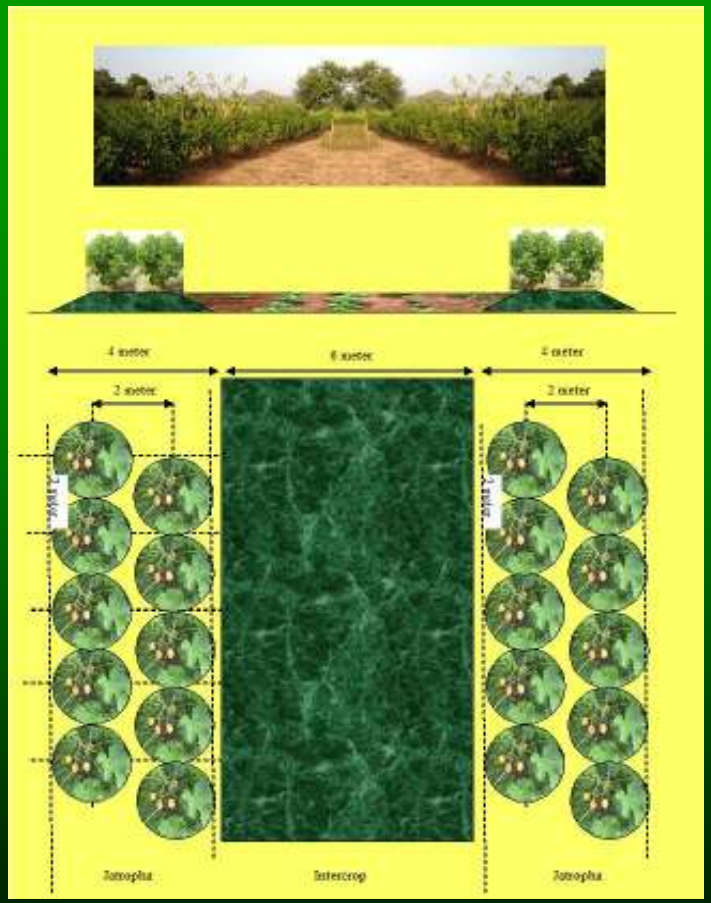
(*Mbosho)*

Mbinga

(Muhekela)


JATROPHA PILOT 1 HA = 10.000 m2 (Model)
SEED SELECTION
20 MTR
NURSERY
40x60 MTR
MIXED CROPPING SYSTEM
65 MTR
80
mtr
Storage and instruction
Soil
Sand
Measure
Water

Introduction of Jatropha in a mixed farming system in Tanzania



40% Jatropha curcas and 60% food crop

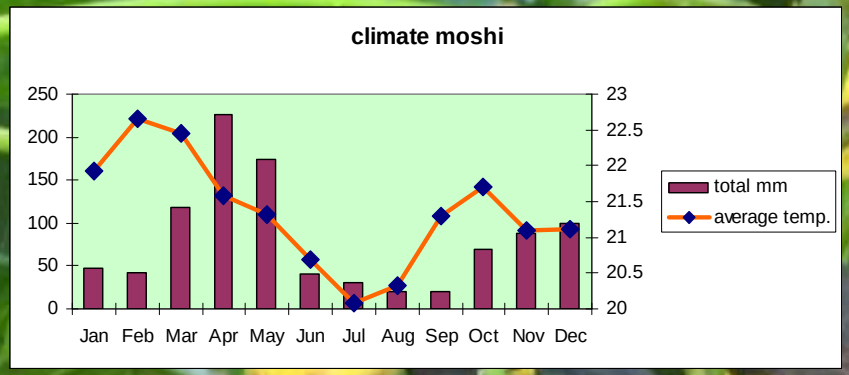
maize
sweet potato
ground nut
beans
sesame seed
wheat
pigeon peas
sunflower

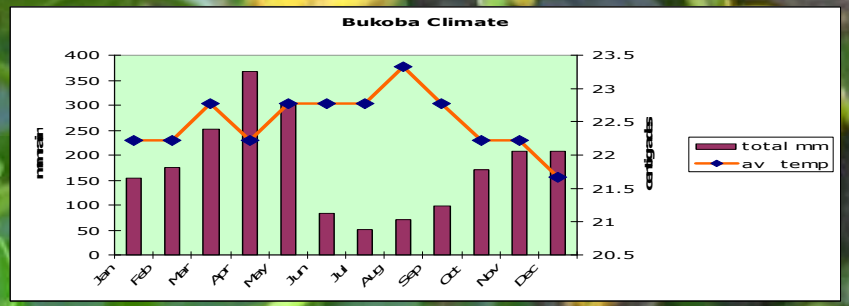
Area and number of farmers.

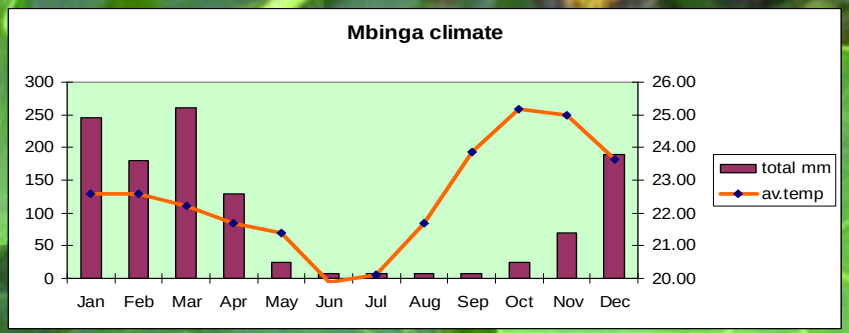
	Number of farmers	Total area (ha)
(potential is 25% of total number of co-operative members)		
Bukoba	15000	5500
Kilimanjaro	17000	6000
Mbinga	2000	800
	34000	12300

Tanzania perspective for Jatropha curcas products

Estimated area in 2015 50.000 ha? = 165.000 mt seed =46.200 mt oil







Maximum yield prodictions based on climate (kg seed/Ha)

Moshi-2500 kg/ha (2.5mt)

Bukoba 4000 kg/ha (4.0mt)

Mbinga 3500 kg/ha (3.5 mt)

Average`3333 kg/ha

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00:02:12

Expected Jatropha yield in Tanzania based on Jatrophabook scenario in 2015 (50.000 ha)

≈50.000 Mt of oil

20 mt/truck

X 2500

X 0.5

How to increase Jatropha oil production

- Select better area,s
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

How to increase Jatropha oil production
Increase area!!

- Select better area,s
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

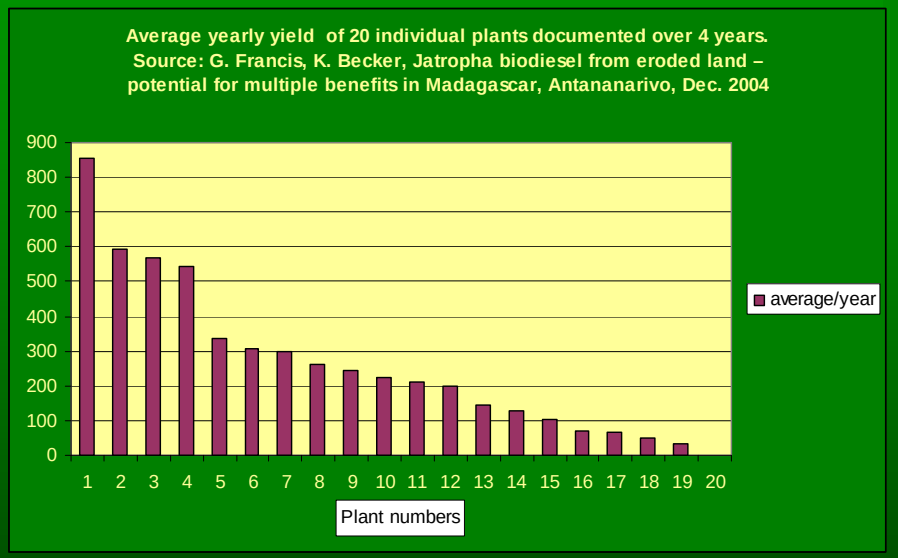
Conditions

- Environment
- Society
- Climate
- Realistic
- Economical viable
- Interesting for farmers!

How to increase Jatropha oil production
Selection!

- Select better area,s
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

High yielding and disease resistant



How to increase Jatropha oil production
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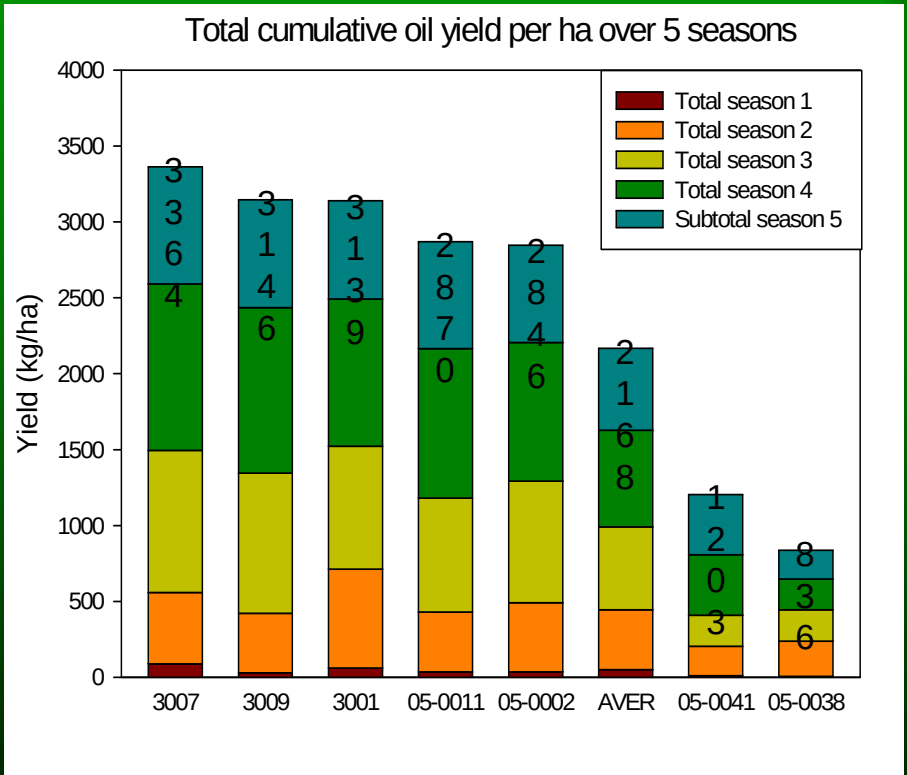

How to increase Jatropha oil production

- Select better area,s
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

Agricultural production in Tanzania

- is one of the lowest in the world due to:
  - poor agronomic practices
  - poor planting material,
  - lack of fertilization
  - exhausted and eroded soils
  - irregular rain pattern

How to increase Jatropha oil production

- Select better area's
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

- Local collection area’s
- No middle man?
- Fair price

How to increase Jatropha oil production

- Select better area's
- Increase area
- Select better plants
- Improve agricultural practices
- Improve seed collection system
- Improve oil expelling.

Localize expelling. (seedcake back to farmer)

- Improve expellers regarding efficiency

Increase the local Jatropha market in order to increase the chance of Jatropha oil export (pulling in stead of pushing)

- Substitute diesel by PPO
- Increase local use of PPO trough electricity production (MFP)
- Increase local soap production
- Improve seedcake fertilizer
- Improve seedcake briquettes

Limitations

- Regulations and technique, workshops
- Logistics
- Research and marketing
- A logistical nightmare, production of fertilizer pellets.
- Money, technology

Increase the local Jatropha market in order to increase the chance of Jatropha oil export

- Substitute diesel by PPO
- Increase local use of PPO trough electricity production (MFP)
- Increase local soap production

- It is cheaper to convert a diesel engine to PPO than to use PPO for the production of bio-diesel
- One Multifunctional platform can improve the standard of living of 100+ households

Jatropha products

Soap, low market value because medical claims not proven.



Soap, low market value because no professional packaging

Jatropha Soap

- With proper marketing based on research regarding the pharmaceutical characteristics Jatropha soap production could become an important (local) industry.

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4. Conclusions and recommendations

Wrap up-Conclusions and recommendations

- Regular export of Jatropha oil out of Tanzania is far away.
- All the energy spend on Jatropha should be directed to local projects. Oil production should be based and used locally.
- Planting seed orchards for Jatropha selection should be started yesterday and large scale in climatologically different area's.
- Planting of Jatropha has to increase drastically in order to create volume.!!!!
- Selling CO2 credits could become an important source of capital to develop larger Jatropha schedules.
- Farmers should be trained to plant both Jatropha and food crops trough the introduction of a mixed farming system.


Chombo hakiendi ikiwa kila
mtu anapiga makasia yake.
asante sana
www jatropha.pro
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