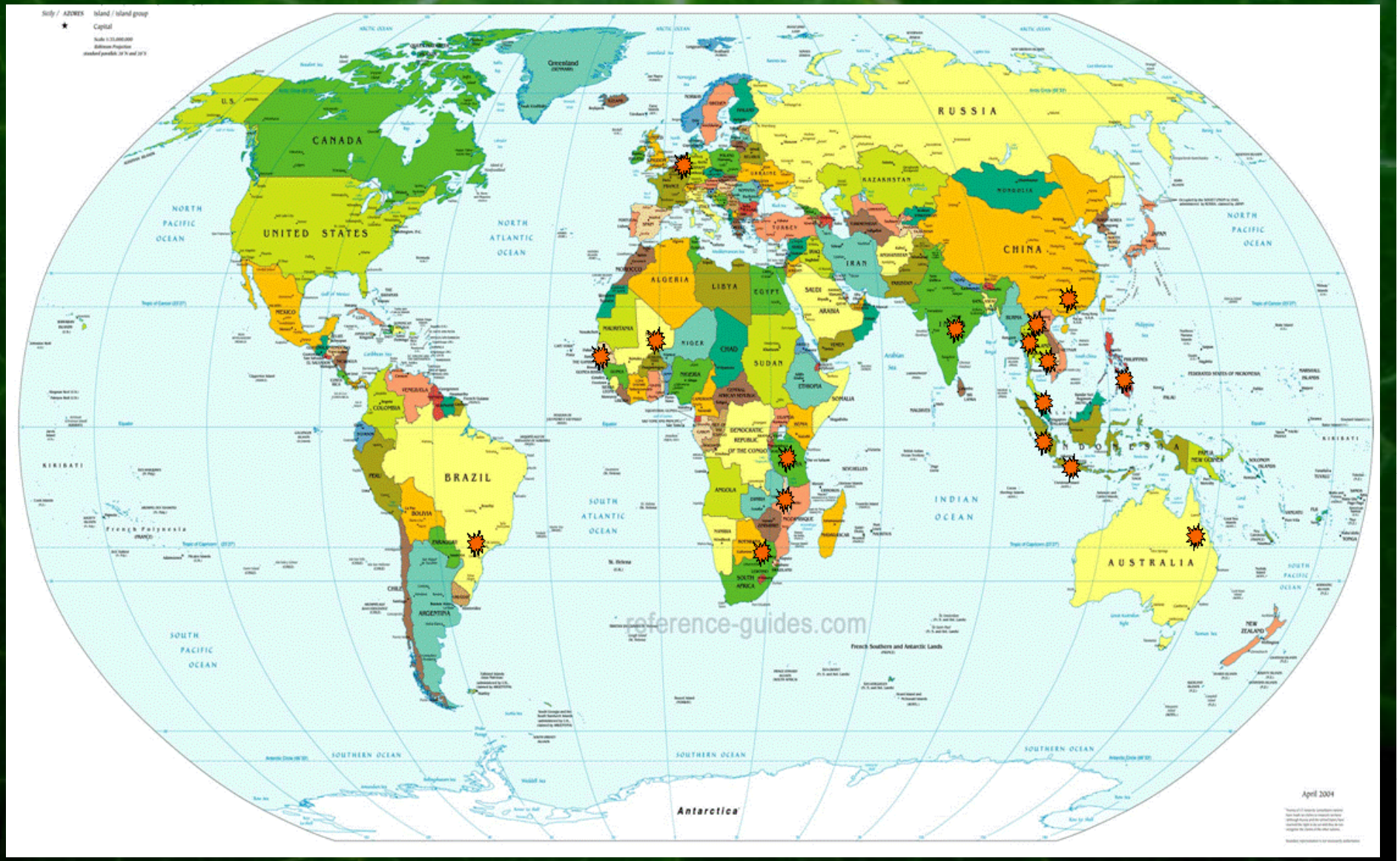
00:00:20

www. jatropha.pro

- Jatropha, it’s quite an experience!!!!!

00:00:18



Ab van Peer, Global Knowledge Platform for Sustainable Solutions for Jatropha Based Bio-Fuels in India, Delhi 21/12/2012

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00:00:58

Subjects to cover

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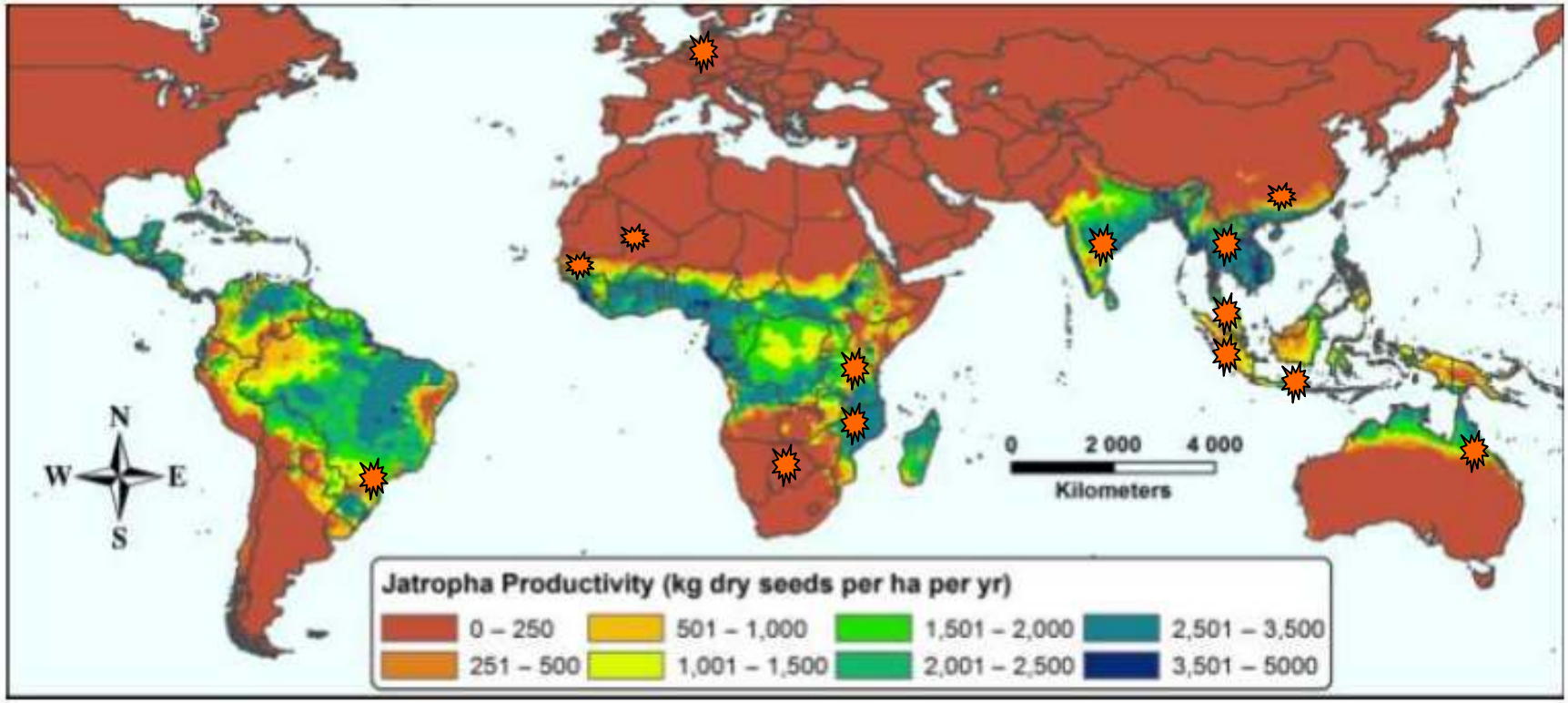
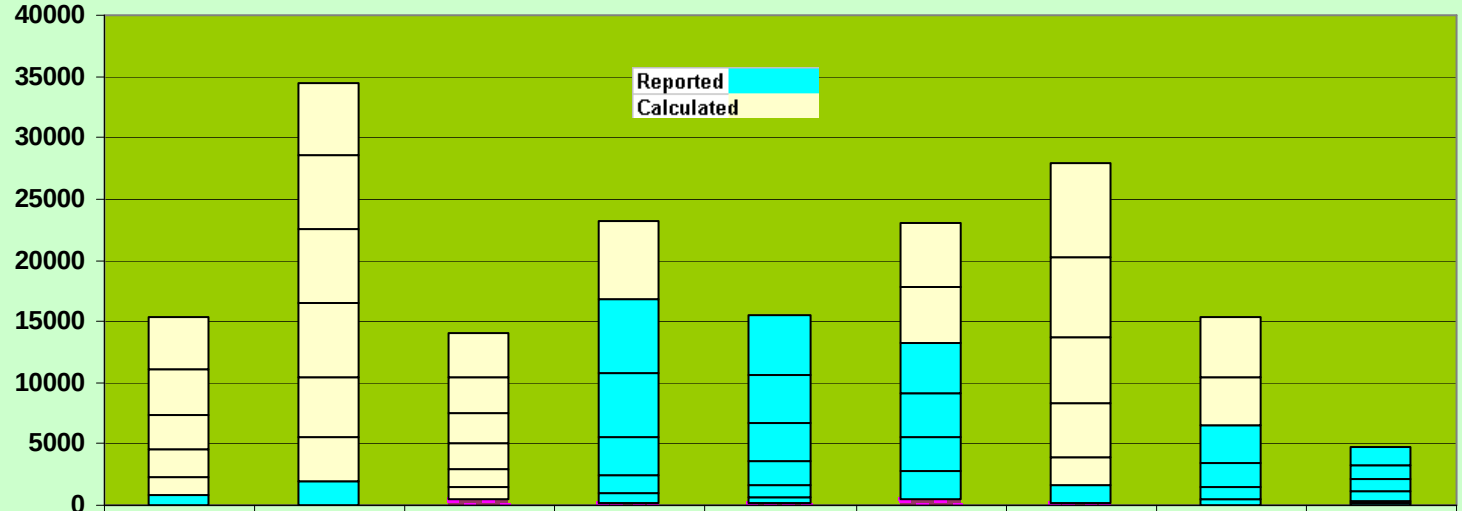


Trabucco, Antonio, Wouter M. J. Achten, Colm Bowe, Raf Aerts, Jos van Orshoven, Lindsey Norgrove, and Bart Muys. 2010. "Global Mapping of Jatropha Curcas Yield Based on Response of Fitness to Present and Future Climate." *GCB Bioenergy* 2 (3): 139–151. doi:10.1111/j.1757-1707.2010.01049.x.

Yield prediction of Jatropha curcas accumulated over 7 years using various sources

kg per ha



	Tanzania (Bukoba)	India .Joil best case*	India. Joil base case	Thailand.Quinvita	Paraguay	Nicaragua	Vietnam (VBM)	Mozambique (Viridesco)	Kenya (GTZ)*
Reeks9									
7	4363.75	6000	3500	6370	4780	5220	7634	4875	1427
6	3643.75	6000	3000	5980	4000	4641	6567	4000	1189
5	2923.75	6000	2500	5240	3000	4062.5	5500	3000	991
4	2203.75	6000	2000	3080	2000	3484	4400	2000	793
3	1483.75	5000	1500	1530	950	2786	2200	1000	198.25
2	763.75	3500	1000	700	600	2327	1485	500	141.61
1	43.75	2000	500	230	100	500	165	0	6.66
0	0	0	0	0	0	0	0	0	0

Climatic growing conditions of Jatropha curcas L.

W.H. Maes, A. Trabucco, W.M.J. Achten, B. Muys
Katholieke Universiteit Leuven, Division Forest, Nature and Landscape, Celestijnenlaan 200 E Box 2411, BE-3001 Leuven, Belgium
International Water Management Institute (IWMI), P.O. Box 2075, Colombo, Sri Lanka. 2009

Based on herbariums specimens in Central America

The climatic conditions at worldwide plantations were different from those of the natural distribution specimens for all studied climatic variables, except average maximum temperature in the warmest month. Roughly 40% of the plantations were situated in regions with a drier climate than in 95% of the area of the herbarium specimens, and 28% of the plantations were situated in areas with Tmin below 10.5 C

00:00:58

SOILS

www. jatropha.pro

Lack of Phosphate is a problem in tropical soils

Country	Remarks	pH	remark	N= kg N/ha	remark	P=P-Al, mg P2O5/100gr	remark	K= mg K/kg	remark
Thailand	unused land	4.4	very low	30	low	<3	very low	32	low
Indonesia	agriculture land	5.7	low	115	good	14	very low	122	good
Indonesia	neglected construction site	4	very low	45	low	<3	very low	27	low
Tanzania	cleared bush, suitable for agriculture	7.6	high	251	high	<3	very low	139	good
Cambodia	neglected agriculture land	3.8	very low	18	very low	6	very low	20	low
Thailand	former agriculture area	4.4	very low	24	low	<3	very low	58	low
Cambodia	cleared bush	6.8	good	91	rather low	<3	very low	154	good

00:00:58

SOILS

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Lack of Phosphate is a problem in tropical soils

Solution	Result
•Fertilization	•More growth
•Mycorrhiza	• More oil

BUT

To much P in pure Jatropha oil will lead to plugging of filters. It may also cause damage in the combustion chambers.

More P in soil = More P in plant = More P in Seed= More P in oil??????

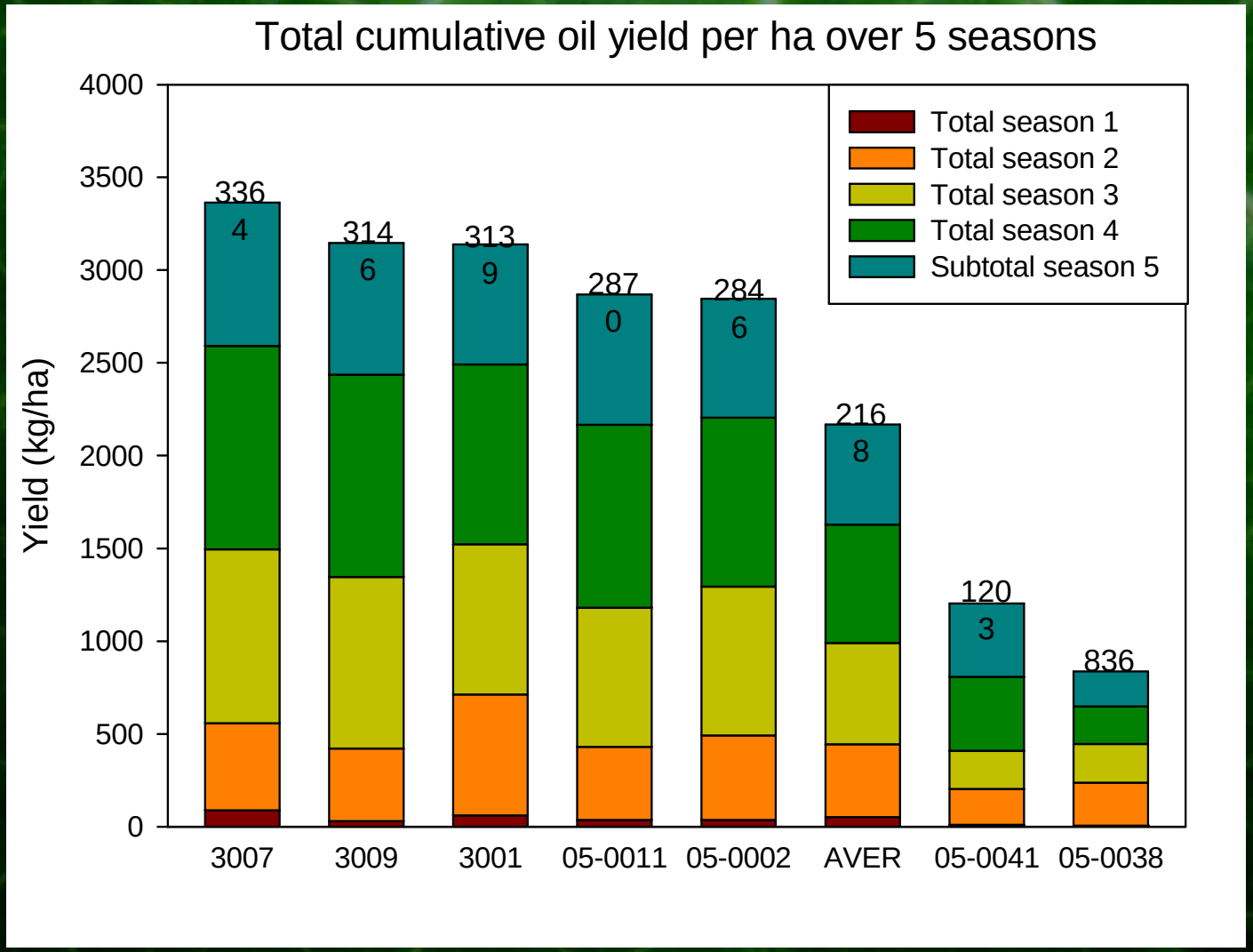
Selection and propagation

Soft cuttings

Selection and propagation

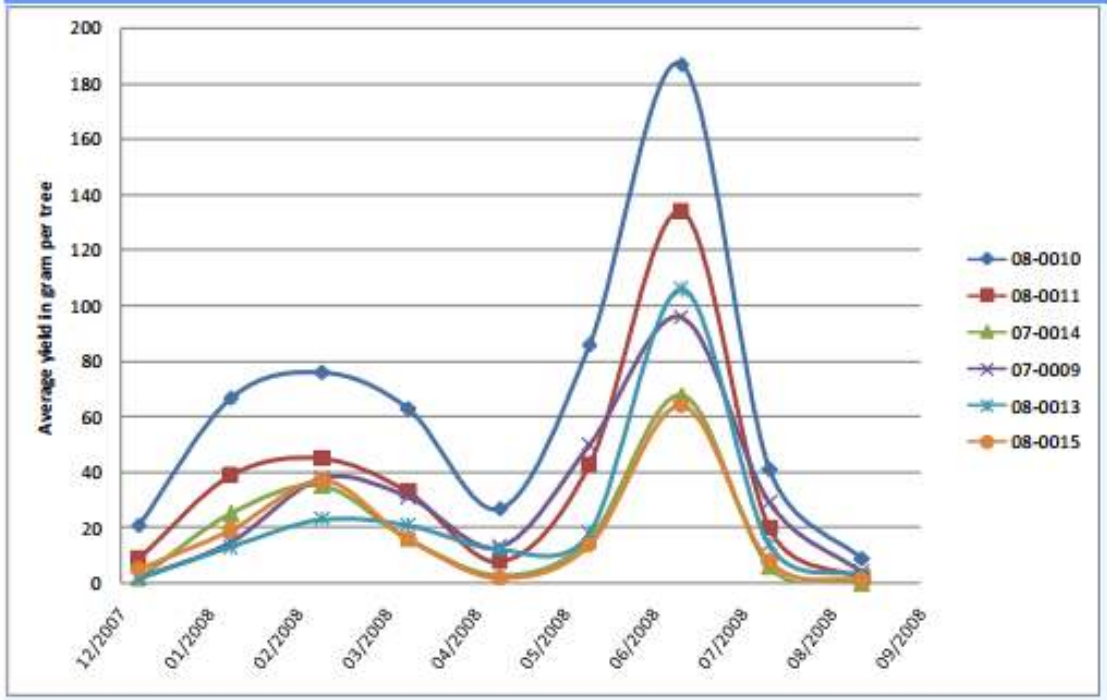
Selection field in Pakuwan, Indonesia

Breeding and selection



Value of selection

JC-2007-09 : PPT BENGKULU - INDONESIA



Accession 08-0010:

- Oil content: 35%
- FA:
  - 16:0: 13.8
  - 18:0: 5.4
  - 18:1: 47.3
  - 18:2: 32.5

Accession 08-0011:

- Oil content: 35.6%
- FA:
  - 16:0: 14.5
  - 18:0: 5.7
  - 18:1: 46.8
  - 18:2: 31.9

Propagation

Method	Benefit	Limitation
Seed	• Quick/Easy • Large numbers	Selecting populations or hybrids takes time
Hard cuttings	• Easy	Low quality plants
Soft cuttings	• True to type • Easy	Probably expensive
Tissue culture	• True to type • Good quality plants	
Grafting	• True to type	Root stock characteristics unknown

Propagation

www.jatropha.pro

Seed

Propagation

- **Hard cuttings**

Propagation

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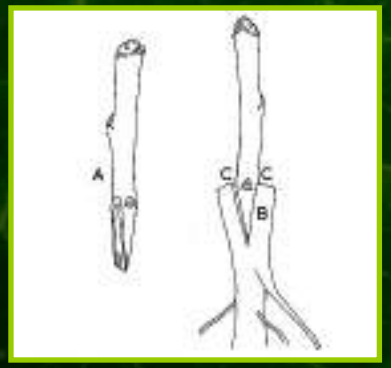
Soft cuttings

8 days

Root systems

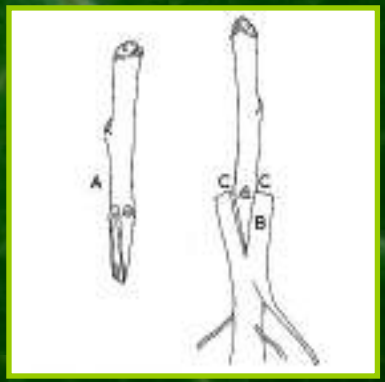
The way of propagation has a direct influence on the root system

Pictures From Research In India



Root systems

- The total apple and pear and citrus etc. etc… industry relies on trees grafted on a rootstock with known characteristics to improve: yield, taste , colour, frost hardiness etc.



Influence of root systems on grafted scions ????

Root systems

Pinroot

- Erosion control
- Soil improvement
- Drought resistant

Influence of different root systems on yield ????

Pruning

- Jatropha flowers at the top of the branch. So the more branches you have, the more flowers you have? **Not true!!!!** Jatropha needs full sunlight to flower and with to many branches the Jatropha plant becomes to dense and a lot of branches will not flower at all.

Pictures D1

Pruning

- Pruning therefore is a continuous process of thinning and choosing the right branches. Cutting back a Jatropha tree completely will cost at least the total yield of one season and it will take years to build up a good yielding plant again.




Days after pruning: 9-15-80-145 (Pictures from Jose Ines Bazan-Mota, Tecoman, Mexico)

Seed cake applications ?

Fertilizer

Fuel for cooking

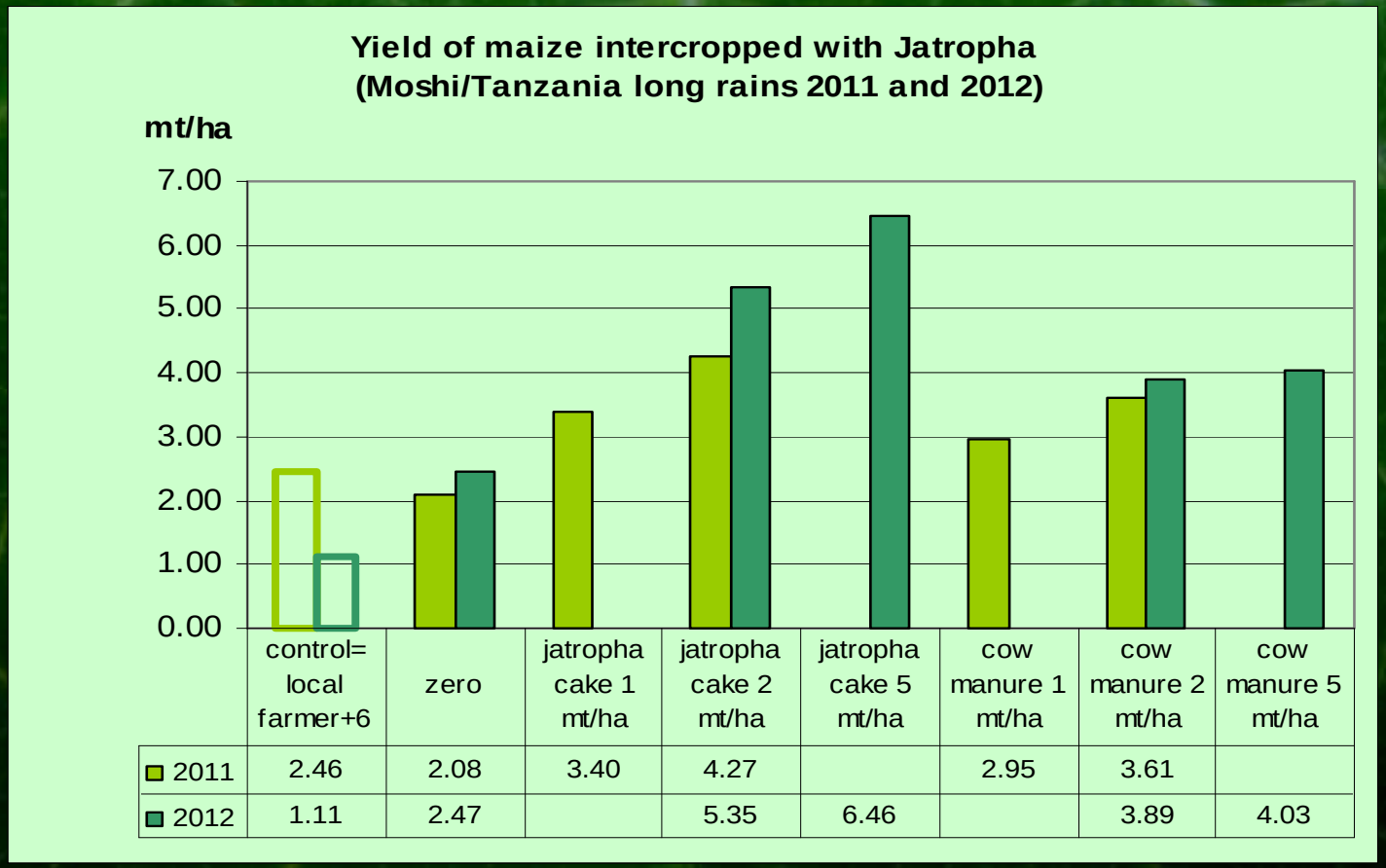
Biomass for gazified energy production

Hard Board

Snail repellent

Fodder

Results in a mixed farming system with Jatropha seedcake in Tanzania



	control= local farmer+6	zero	jatropha cake 1 mt/ha	jatropha cake 2 mt/ha	jatropha cake 5 mt/ha	cow manure 1 mt/ha	cow manure 2 mt/ha	cow manure 5 mt/ha
2011	2.46	2.08	3.40	4.27		2.95	3.61	
2012	1.11	2.47		5.35	6.46		3.89	4.03

Seed cake applications ?

5.6 Molluscicidal properties of Jatropha curcas against vector snails of the human parasites *Schistosoma mansoni* and *S. japonicum*

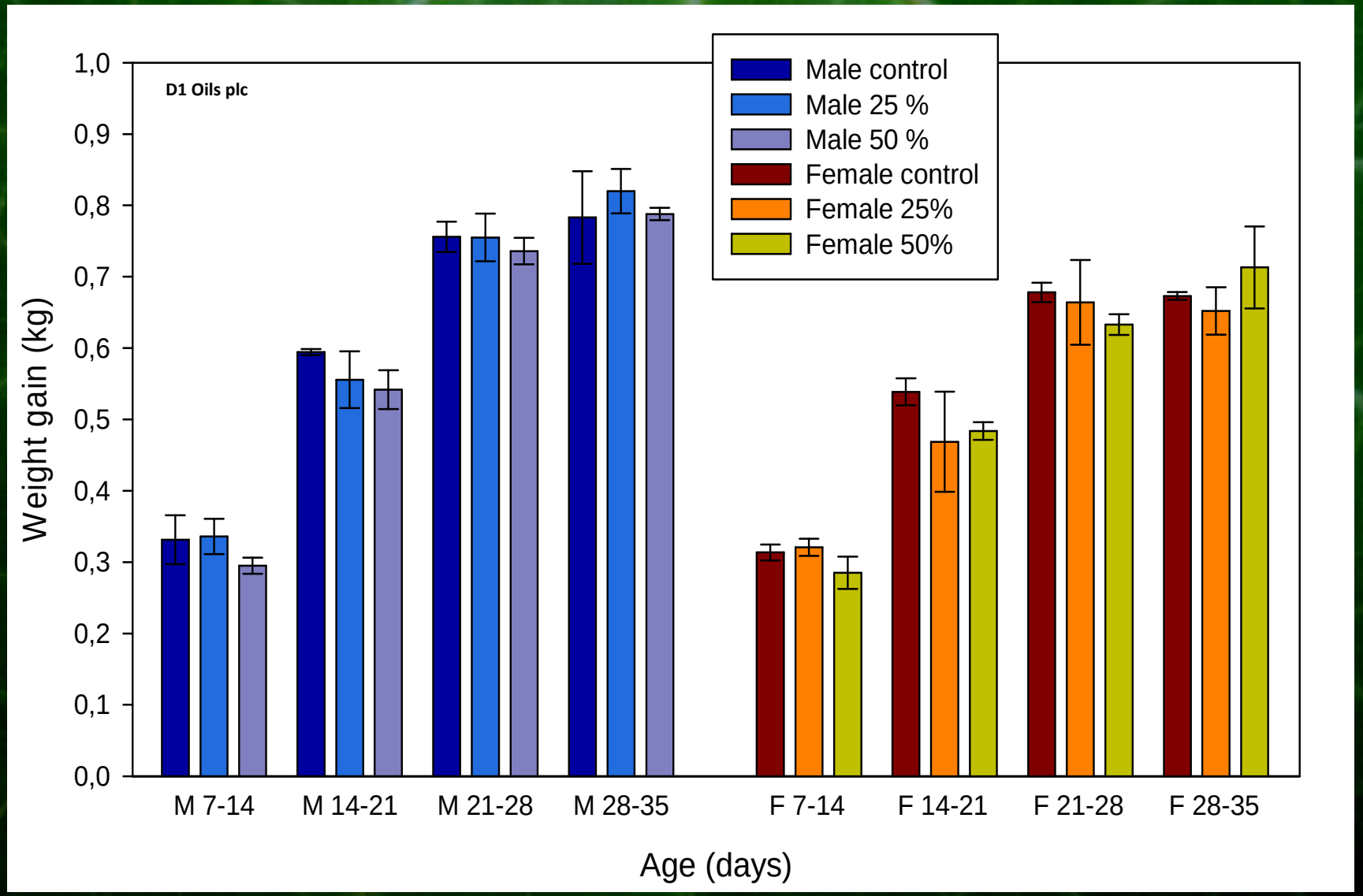
M. Rug, F. Sporer, M. Wink, S.Y. Liu, R. Henning, A. Ruppel

Would it be possible to use seedcake as a fertilizer and a snail control in rice?????

Design of chicken feeding trial with neutralized seedcake

- Variables in trial:
  - Gender of animals (3 repetitions of 4 Ross 308 male or female animals tested)
  - Protein source rations:
    - 100% soybean meal + 0% JKM
    - 75% soybean meal + 25% JKM
    - 50% soybean meal + 50% JKM
- After 7 days adaptation of all animals to 100% soybean based feed ration, feeding for 28 days
- Measurement of feed intake, weight gain and calculation of Feed Conversion Ratio (FCR, i.e. intake/weight gain)
- Subsequent observations on individual animals for morphological and necrotic defects

Weight gain in 7 day periods for 3 diets and 2 genders



Jatropha Soap

- Anti septic?
- Healing scars and fungus diseases ?

Jatropha Soap

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

Fuel or Food

Large scale energy farming

- **One or a few big farmers with large area's growing monoculture Jatropha. (Volume by property)**
- **Many small farmers with many small area's growing many crops including Jatropha. (Volume by co-operation)**

Fuel for Food

- Small farmers are food producers by definition!
- They can only grow Jatropha as a living fence or in combination with food and other cash-crops

00:00:30

Feasibility study fair trade Jatropha

www.jatropha.pro

- **Max Havelaar fair trade**
- **Eneco Energy**
- **ICCO**
- **Kagera Co-operative Union**

KCU

www. jatropha.pro

Feasibility study on 3 locations

Bukoba

(Ruhanga)

Kilimanjaro

(*Mbosho)*

Mbinga

(Muhekela)

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 improve Agricultural production in Tanzania

1. improve agricultural practices through training
2. introduce better planting material,
3. stimulate fertilization
4. improve soil fertility and soil stability
5. improve water use efficiency

00:22:21

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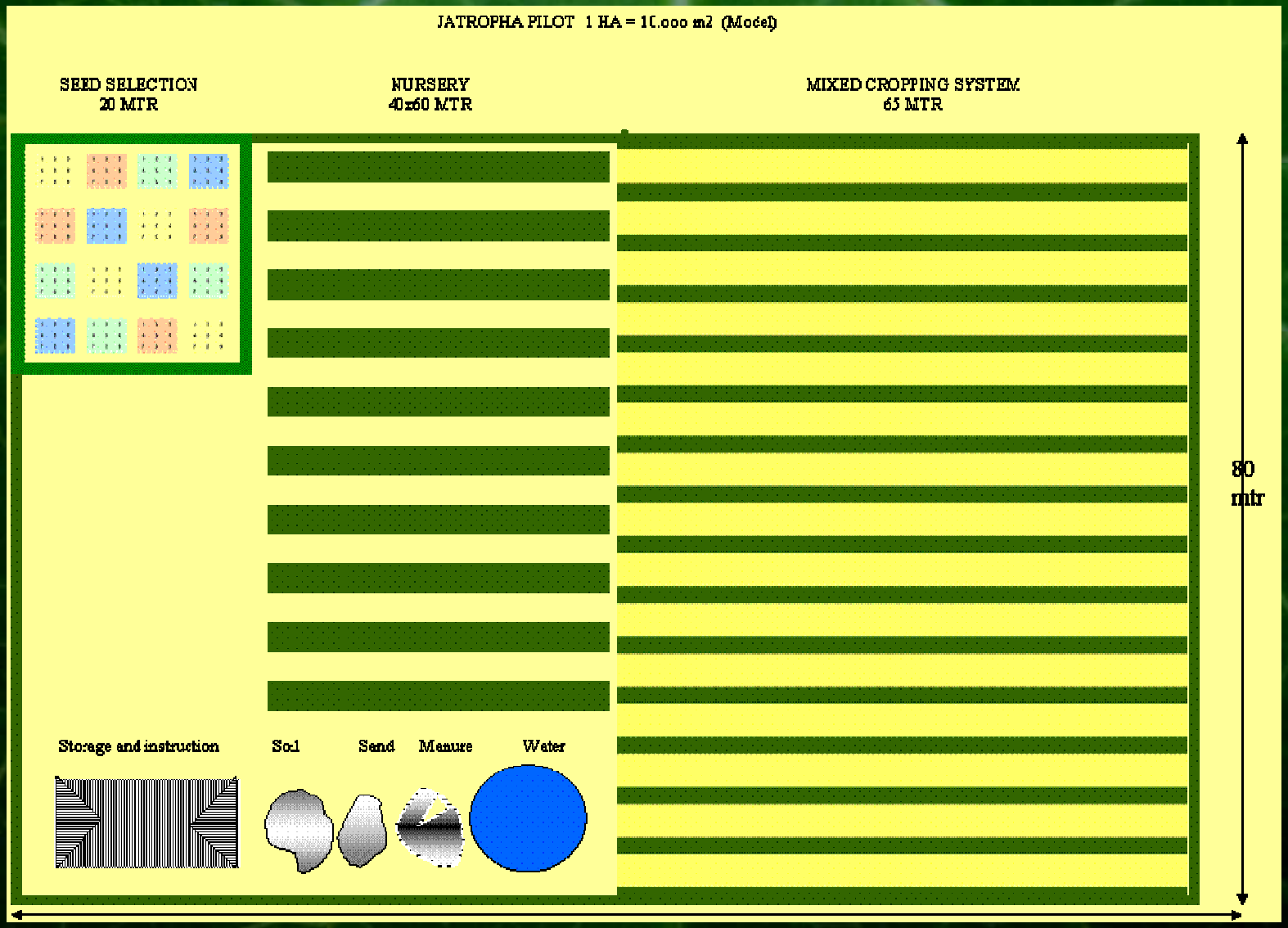

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Introduction of Jatropha in a mixed farming system in Tanzania

40% Jatropha curcas and 60% food crop

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

Increase of food yield of 66% should compensate for loss of 40% production area

Introduction of Jatropha in a mixed farming system in Tanzania

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- BENEFITS FOR JATROPHA

- Pollination
- Weed control
- Input of nutrients

- BENEFITS FOR INTERCROP

- Protection from wind etc
- Jatropha seedcake input

BENEFITS FOR THE FARMER

Higher income

Soil improvement through higher input resulting in higher yields

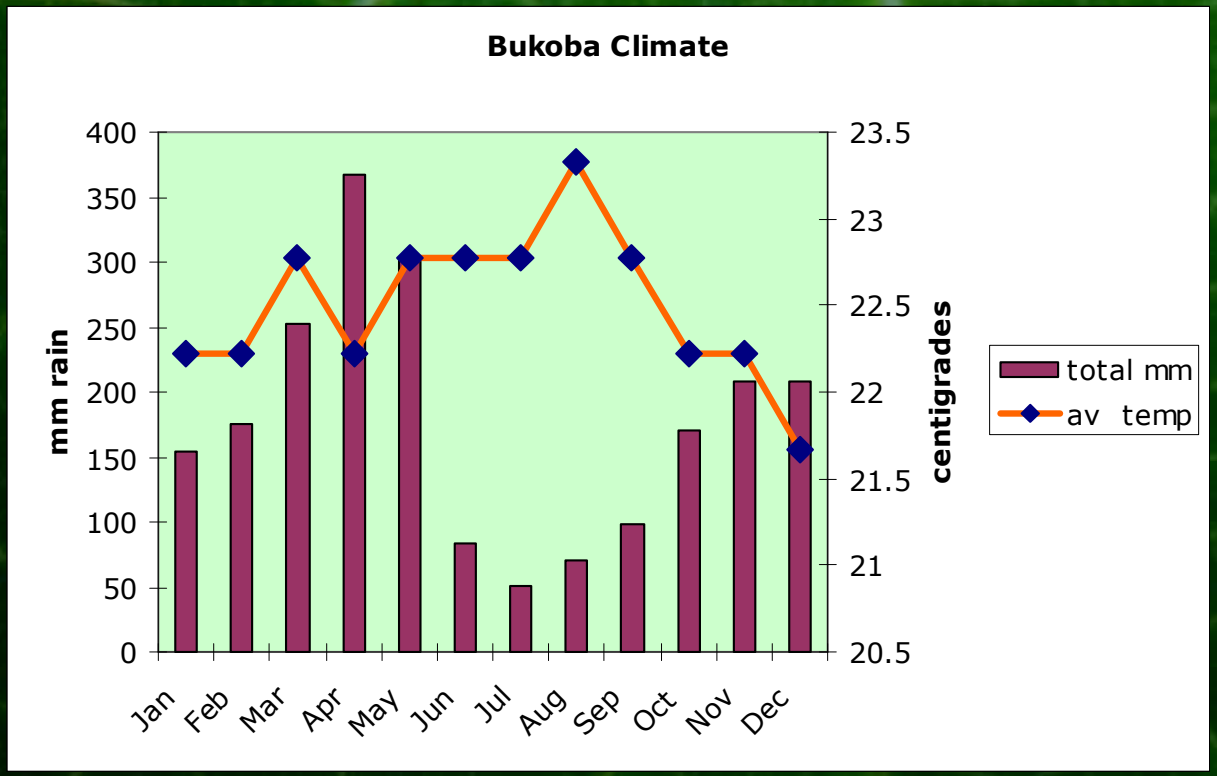
Local oil=energy production

Introduction of Jatropha in a mixed farming system in Tanzania

Nutrient values of seedcake

Sample nr.	Country	Laboratory	Date	Org. matter gr/kg dry mat.	N gr/kg dry m.	Phosphate P2O5 gr/kg dry m.	Potassium K2O gr/kg dry m.
232548	Indonesia	Sucofindo (Indo)	01/05/2007		3.7	1.1	1.6
501065	India	BLGG (NL)	01/06/2007	85.6	4.1	1.9	1.9
501066	Indonesia	BLGG (NL)	01/06/2007	81.3	4.2	0.2	2.3
20109567676	Tanzania	BLGG (NL)	18/08/2010	84.3	4.4	4.1	1.2
19201	India	South Africa	01/06/2007		3.5	0.3	2.4
Internet	Mali	**SRCVO Mali**	01/06/1990		4.1	0.5	1.2
	Mali	Henning	01/06/1990		5.7	2.6	0.9
average		Seedcake		83.7	4.2	1.5	1.6
		Cattle dung		25.5	1.2	0.2	1.1
		EFB Palm		43.11	0.8	0.2	2.6
		Chicken manure		35	3	2.7	1.5

Expected yield Bukoba



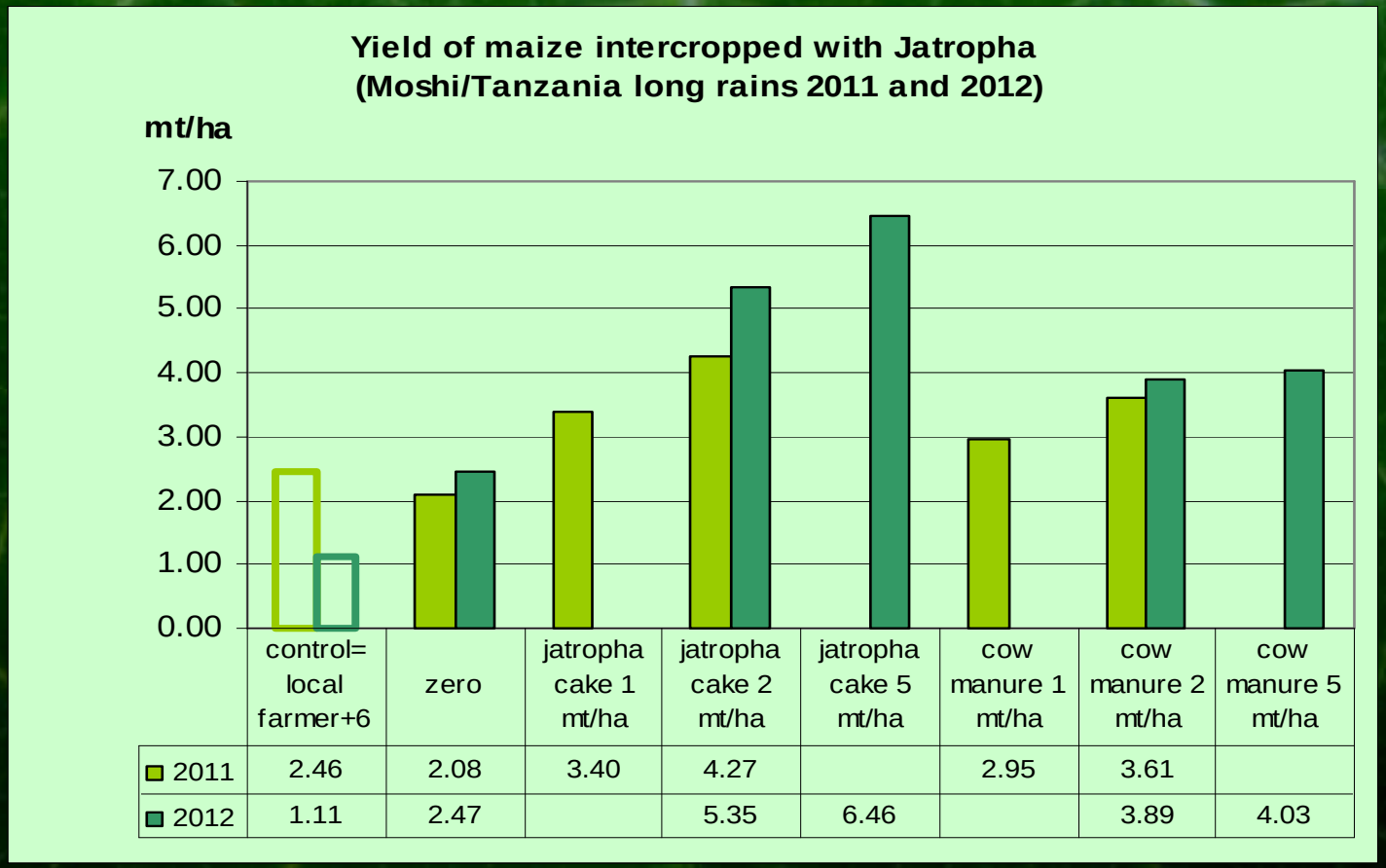
4 MT/ha alley cropping
0.800 gr m2/hedges

Total area= 5500 ha

Maximum seed yield after 5 years

22000MT seeds = 5500 MT oil

Results in a mixed farming system with Jatropha seedcake in Tanzania



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