



# Equipment for oil processing

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Solution for  
BBC (Bilibiza Biofuel Center) in  
Mozambique;  
based on workshop of Diligent  
Tanzania

# Process of producing oil from Jatropha seeds



## Process steps:

- 1: Cleaning of seeds before pressing**
- 2: Pressing**
- 3: Sedimentation in storage tanks**
- 4: Crude filtering, using bags or gauges with gravity**
- 5: Fine filtering, using bags or gauges with gravity**
- 6: Or fine filters in pressure units (up to 2.5 bar)**
- 7: Storage of end product, plus pumping to user tanks/jerrycans/drums.**

# How to choose equipment?



**Answer the following questions first:**

- **Is there a proper supply chain ?**
- **With possibility to obtain spares?**
- **Technical staff to support, eg for commissioning, technical support repairing etc.**
- **High cost versus low cost,  
Latter gives probably a shorter life  
and much repairs (high downtimes)**

# Equipment per process step; example of Diligent Tanzania



# Workshop of Diligent Tanzania



- Pressing capacity 1 shift ca 7 Ton/day---> 1400 liters of oil/day net.
- 4 oil presses
- 8 persons in workshop + 3 overhead
- covered workshop area: 40 x 7 m= 280 m<sup>2</sup>

# Equipment per process step:



- **Step 1: Cleaning of seeds before pressing;**
- This can be done by means of a sieve with mesh gauge, by hand (in the field) or mechanic-electrical



# Step 2: pressing



- A Sayari press made in Tanzania is working satisfactorily
- Capacity according supplier 100 kg/hr; real 70 kg/hr; oil output 20% (1 time)
- Power 7,5 kW
- Weight 322 kg.



The following selection criteria have been introduced: (from Note on Jatropha pressing-May\_2008)

- Ease, speed and reliability of the supply chain;
- Drive train of the press, either with diesel engines (on PPO/diesel) or electrical driven
- Power Take Off with pulleys and belts or with gears
- Required maintenance and spare parts;
- Training possibility of operators;
- Measuring temperature of pressing
- Costs



# Other 3 presses at Diligent Tanz.



- 1 large press from India (pict) Cap: 450 kg/hr
- Plus another 2 German KEK presses.



# KEK press



- Specification:
- Type KEK P0101, strainer type
- Capacity 100 kg/hr
- Power 7.5 kW
- rpm press : 37
- Efficiency: 26,5-27 %



# Step 3: Settling for sedimentation



- Settling to 5 days is done in plastic water tanks of 1 m<sup>3</sup>.
- Also oil drums could be used



# Step 4: Crude filtering



- Cotton bags of 200 micron are used.
- For fine filtering bags of 5 micron are used



# Step 6: Fine filtering



- At Diligent Tanzania the following is used: AMA Pressure (2.5 bar) filtering , capacity 150 l/hr; Up to 0,5 micron.
- This unit is expensive (€ 8250 according AMA)





# Step 7: Storage of end product, plus pumping to user tanks/jerrycans/drums.



- Diligent Tanz: A fuel gun with volume counter, pumping from the clean storage tank.
- For BBC a handpump without counter, using standard 20 l cans could be used.



# Laboratory at Diligent Tanz;

## Measuring possibilities:



- Oil contents of seeds
- Moisture contents of seeds
- Water and particle contents of oil
- Acidity
- Phosfor contents
- Density
- Oxidation nr.



# Conditions in rural Cabo Delgado points to overcome



- No infrastructure, nearest town Pemba, is 3,5 hrs driving
- No electricity in villages
- No money available
- Technical people only in Pemba, no skilled people want to live in rural areas.



# Conditions in Cabo Delgado Opportunities



- Enough land available
- Cheap labour
- People eager to learn and willing to work if they earn income

# Example



- Farmers Club
- Water with hand rope pump
- combination food and jatropha
- knowledge input by field extension worker of ADPP (TPG)



# Bilibiza Biofuel Center



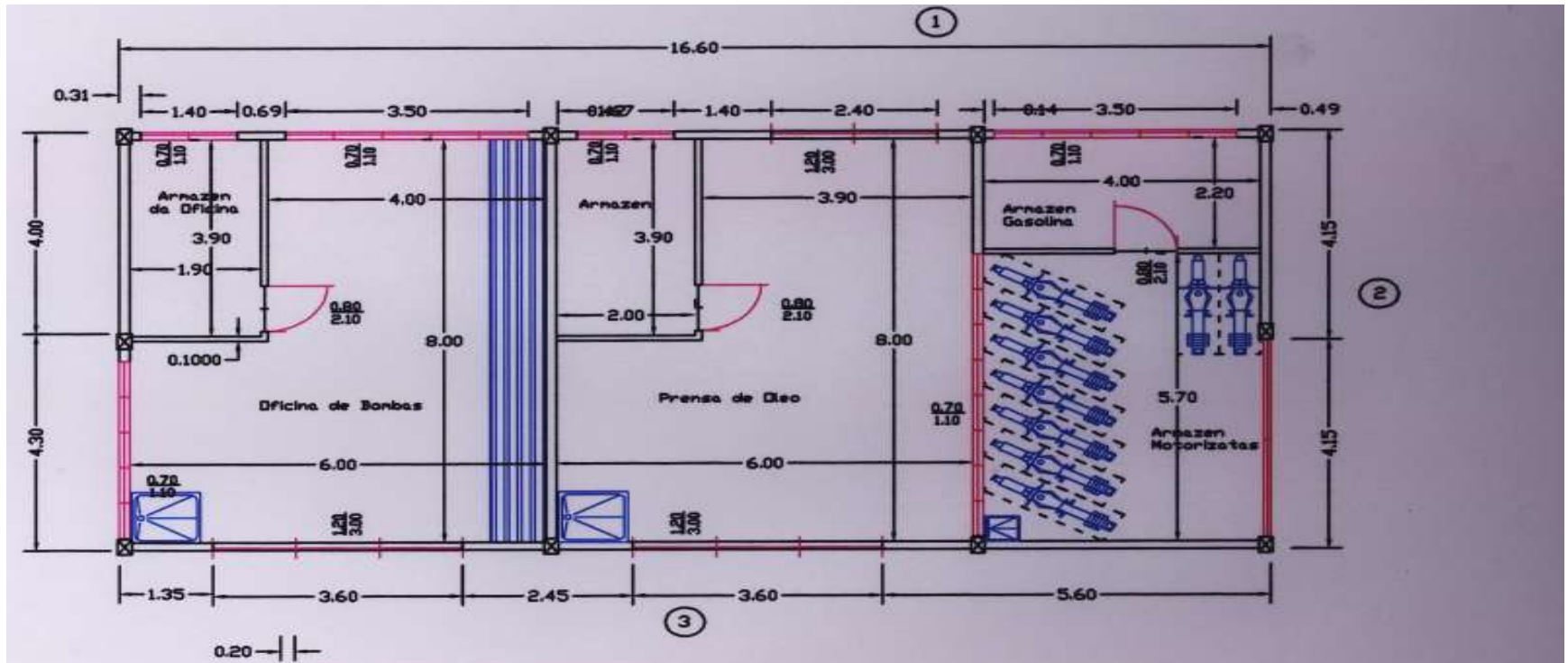
- **Capacity: 700 kg/day --->120 l/day crudeoil (in 1 times pressing, with 17 % efficiency)**
- **> 100 l/day net (after sedimentation)**
- **with 1shift; 3 persons plus 2 overhead**
- **Workshop floor: 8x6 m= 48M2**
- **1 Sieve**
- **1 Sayari press**
- **4 settling tanks**
- **1 set of crude plus fine filters**
- **1 clean oil storage tank**

# Questions



- On PPO quality; is degumming and/or neutralisation necessary?
- If yes; can we not better make bio-diesel?
- How to get economics better?
- How to make better high efficient, low cost presses, preferably skid mounted?

# BBC Workshop lay-out



ADPP Moçambique - Cabo Delgado - Bilibiza		
Escala 1:100 Data	Oficina Planta de Piso	Projectou Desenhou Calculou