Jatropha Hedging Potential

BIOFUEL SUPPLY CHAINS
and
CAPACITY BUILDING WORKSHOP

ACP S&T PROGAMME

3 -5 JUNE 2010

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Presentation Objective

To introduce a potential application for

Jatropha Curcas

that will assist in improving crop production and therefore will contribute in poverty reduction for small-holder farmers in the rural areas of Northern Namibia.

Presentation Outline

- Current Agriculture Situation
  - Africa
  - Namibia
- Reversing the Situation
- How can Jatropha help

Small Holder Agriculture in Africa

Main challenges of Smallholder farming in Africa:

- **to increase production**
- **preserve natural resources.**

This is not an easy challenge, but is key to fighting hunger and poverty. Most of today's pressing problems for rural people are related to management of land and water resources. The increase in population has meant that land is no longer enough to sustain the growing populations. Lands once used for grazing are being cultivated and the remaining grazing lands overexploited, resulting in loss of local plants and soil erosion

Small Holder Agriculture in Namibia

Roughly 67% of Namibia's population rely on subsistence farming whereof 70% are female (2001 Population Statistics)

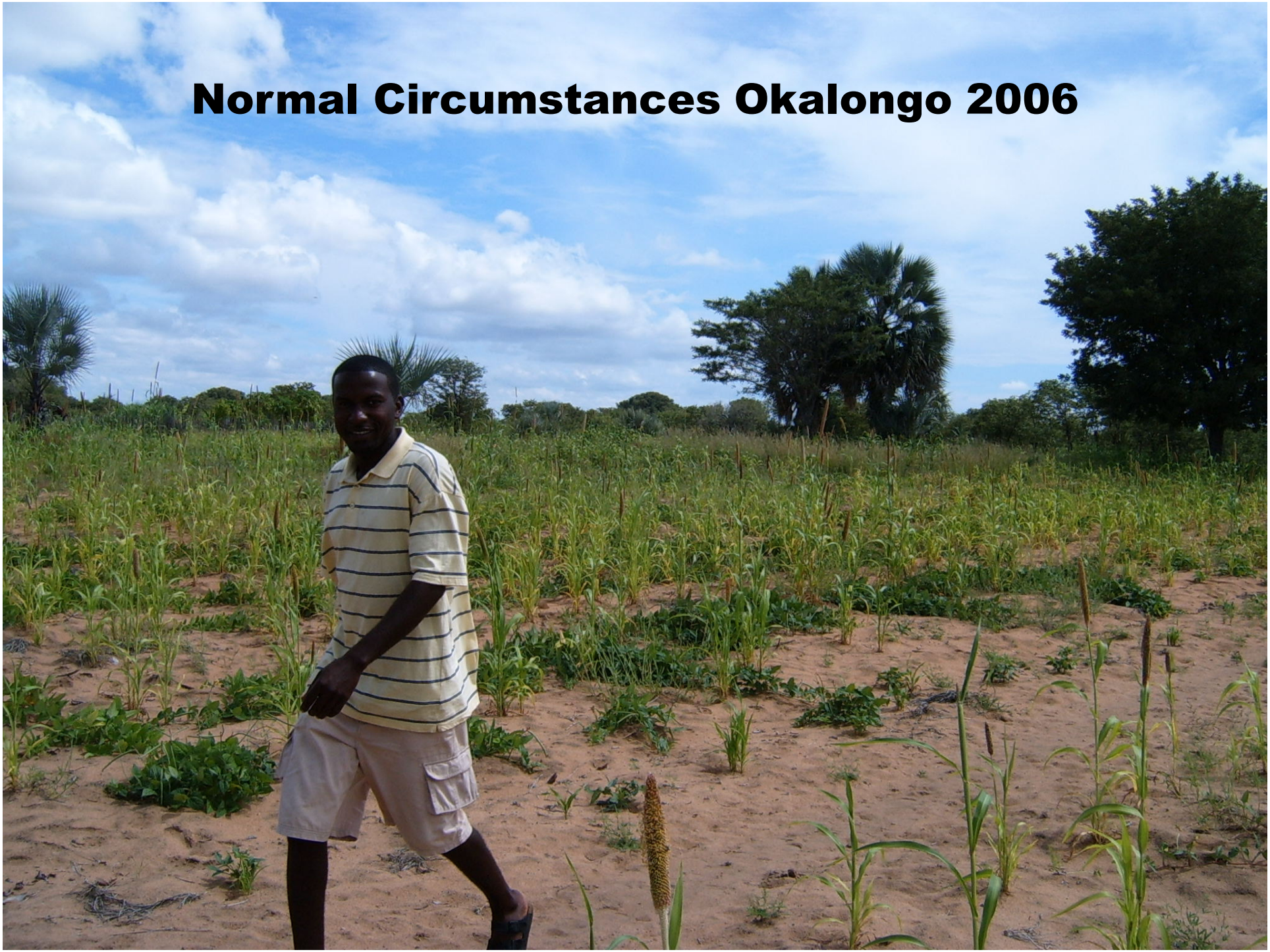
Main challenges of Smallholder farming in Namibia are:

- **to increase production**
- **preserve natural resources**
- **markets (other than controlled products)**

Other challenges:

- **unreliable and erratic rainfall is the norm**
- **droughts are prevalent**
- **soils are infertile**
- **small proportion of farmers use fertilizers**
- **crop and livestock are integrated**
- **few have ready access to draft power**
- **plant late or at high mechanical costs**


Excessive Rainfall / Floods at Ondobe 8 3 2008


Normal Circumstances Okalongo 2006

Namibian Facts

- **Namibian Small Holder Farmers add less than 10 kilograms of fertilizer per hectare of land, be it manure or chemical fertilizer**
- **On average recommended additions are approximately 200 kg of chemical fertilizer or 10 Mt of manure per ha of land**
- **Yields for Namibia Small-holder farmers have declined or stagnated (300 - 450 kg/haPear Millett) since the 1970s, and now stand at roughly one-third of what they should be (1 200 – 1 500 kg/ha)**
- **Intercropping has been done for centuries;**
  - Primarily for Pest Control
- **Intercropping does compete for water**

CONVENTIONAL AGRICULTURE

In conventional agriculture, soil tillage is considered one of the most important operations for creating a favourable soil structure, preparing a seedbed and controlling weeds.

Mechanical implements destroy the soil structure by reducing the aggregate size therefore currently conventional tillage methods are a major cause of soil loss and desertification. Tillage induced erosion leads to massive soil losses annually, this soil erosion is accelerated by wind and water. As a consequence crop productivity is declining


Sandstorm at Omuthiya
10 10 2007

WHO is responsible?

The bitter reality:

- **successful farming depends on a healthy environment**
- **rich soils,**
- **adequate water,**
- **biodiversity on and off the farm**

Much of that environment is already degraded. FARMERS, GRN and SOCIETY at large have the challenging but essential job of raising farm productivity while also protecting and enhancing the environment.

Potentially the situation can be reversed by means of CONSERVATION ARICULTURE

CONSERVATION AGRICULTURE (CA)

- **Globally approved agriculture technology used to limit, arrest, or reverse the effects of unsustainable agricultural practices,**

- **With Specific emphasize on:**
  - **soil erosion,**
  - **soil organic matter decline, and**
  - **physical degradation of the soil,**

- **Whilst at the same time, conserving water, increasing crop yields and reducing excessive pesticide and labour.**

Conservation Agriculture (CA) cont.

Principles of Conservation Agriculture?

1. Disturb the soil as little as possible –

Reduce tillage to the bare minimum; at the very least, only rip planting lines or make holes with hand-hoes for planting seeds.

2. Retain Crop Residue on the soil surface –

Leave crop residue on the soil surface (minimum 33%) this will reduce soil erosion, conserve soil moisture whilst the organic material will enrich the soil.

3. Rotate crop and apply crop management –

Changing and rotating crops is important so that the life cycles of pests and diseases are broken. To fix nitrogen levels in the soil.


CA applied at Okaku
2 4 2008

YIELD BENEFIT

Work load - Farmer prepares field

- manually by hard labour or by tractor

- Farmer controls weed by hand

Conventional Agriculture:

- Farmer Yields on Average of 2,6 ha land

- 1 170 kg Pearl Millett (2.6 ha x 450 kg)
- 75 kg Cowpea (intercropping)

- Very few farmers add Fertilizer manure

Conservation Agriculture:

- Planting in lines is less labour

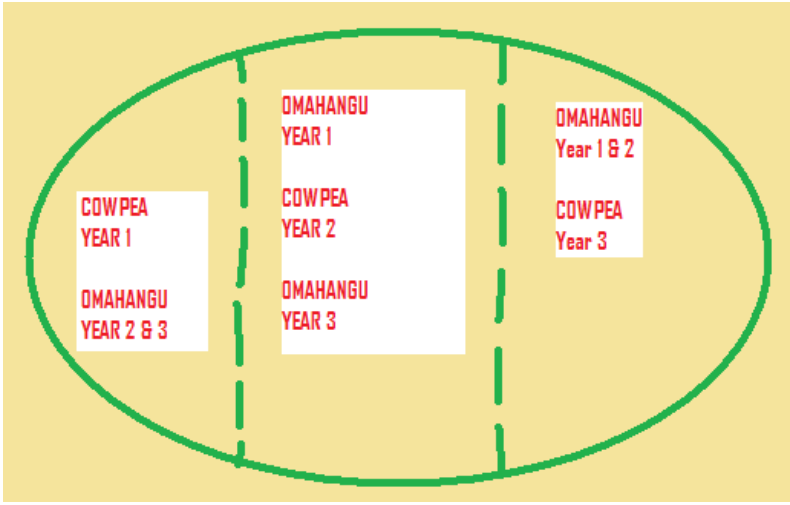
- Farmer should Yield on Average

- 1/3 of 2.6 ha Cowpea 217 kg (250 kg/ha)
- 2/3 of 2.6 ha Pearl Millett 2 080 kg (1200 kg/ha)

BEST PRACTICE - CA

- Divide farm in three equal parts
- Till only planting lines
    - Pearl Millett 1m apart
    - Cowpea 50 cm apart
- Fertilize only planting lines
- Leave at least 33% foliage on the field
- Rotate crops
    - 2 years Pearl Millett
    - 1 Year Cowpea

Green Lines Represent Life Fencing




Typical Farm Divisions of Small Holder Farms

Life Fencing

Densely planted row of plants to prevent livestock from entering unwanted areas.

Benefits

-Protect fields from livestock
-Seed/Oil can be sold for cash
-Reduce erosion from wind and water
-Seed Cake can be used as Organic Fertilizer

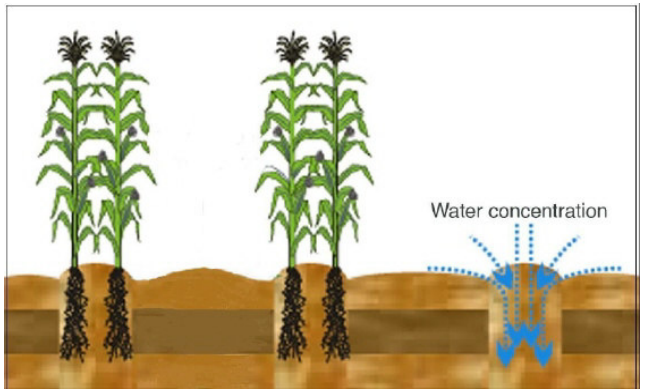
Life Fence at a Homestead in Katima Mulilo


Will compliment the prevention of water run-off
80
Road remains at Elim
6 3 2008


Trial Plot Kavango - East of Rundu
Chemical Fertilizer
2:3:2
Goat Manure
29 2 2008

PLANTING

- Cost of **LABOUR**
- **SEEDS ARE LOCALLY AVAILABLE**
- Unlike other plants Jatropha prefers **no** fertilizer when planted
- Must be watered for at least six months
- If planted at the beginning of the rain season should receive enough water
- Should **not** be planted from cuttings as these plants produce **Lower Yields**



Source SANITAS Botswana

Jathropha Plant and its Seed at Ondobe

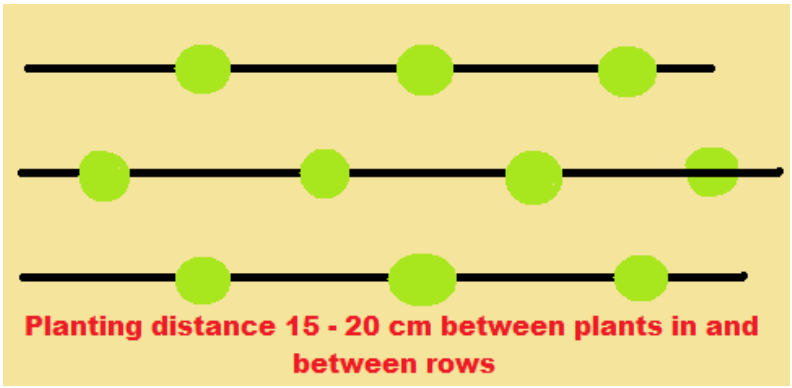
COST BENEFIT - NUT

0,8 – 1kg seed per m (Kenya Ave 1.12 kg)

Average farm border lines 920 m

Total Seed per line: 920 x 0.8 = 736 kg

Income Estimate @ N$ 0.45 per kg



Single Line **N$ 331.20**

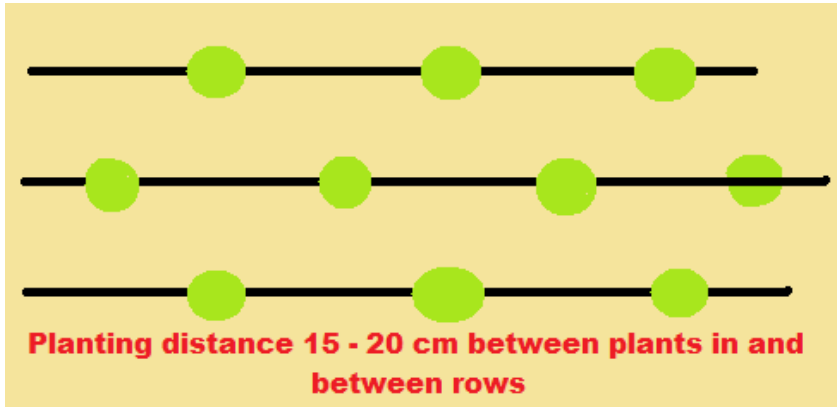
Double Line **N$ 662.40**

Triple Line **N$ 794.88 (20% Yield Loss Density)**

COST BENEFIT - OIL

0,8 – 1kg seed per m (Kenya Ave 1.12 kg)
Average farm border lines 920 m
Total Seed: 920 x 0.8 = 736 kg
Total Oil Extract: 736 x 30% = 220.8 l
Income Estimate @ N$ 2.23 per l

Single Line	**N$ 738.58**
Double Line	**N$ 1 477.15**



Triple Line **N$ 1 772.58 (20% Yield Loss Density)**

Oil Press

Manual

Mechanical

REGIONAL ECONOMICAL IMPACT

Number of NC Rural Farms - 230 000
(Population Statistics 2001)

Increase in Income:

Fence	**Jatropha Oil**	**N$ 1772**
Crop	**Pearl Millett** (910 kg @ N$ 2.59 / kg)	**N$ 2357**
	Cow Pea (142 kg @ N$ 3.20 / kg)	**N$ 454**
	Total Increase per Farm	**N$ 4 583**

Increase in Income of the 4 O Regions

N$ 4 583 x 230 000 = N$ 1 054 090 000

SUSTAINABILITY

Carbon Dioxide Absorption	**8 kg/Annum/Tree**
Average 19 Trees / m	**152 kg/Annum/m**
Average 920 m of Fence	**138,84 Mt/Annum**

Extension Services and additional research will be financed from the sales of Carbon Credits

SPIN - Off BUSINESS

- **Production of Cooking Gas**
- **Organic Fertilizer**
- **Soap Manufacturing**
- **Plant Nursery**

DIESEL DRIVEN POWER STATIONS

- **Arandis Power Station**
- **Walvis Bay Power Station**
- **Tsumkwe Power Station**

erongo

Miljoene vir kragsentrale

'n DIESELKRAGSENTRALE teen 'n beraamde oprigtingskoste van N$1,2 miljard verteenwoordig die grootste nywerheidsbelegging in jare op Arandis. Die projek, bekend as Gecko, sal oor 'n opwekkingvermoë van 130 megawatt beskik en krag sal minstens 16 uur per dag gelewer word.

Die kragsentrale is 'n projek van Natura Energy en 'n volledige voorlegging is reeds aan die stadsraad van Arandis gedoen. Dit sal olieaangedrewe wees met herwinde brandstof wat hoofsaaklik vir die doel gebruik sal word. Afvalolie sal vir die doel vergaar en behandel word. 'n Produksieleeftyd van twintig jaar word beplan en NamPower, die nasionale kragverskaffer, sal een van Gecko se belangrikste klante wees.

Die aanleg sal ook strategies tussen verskeie uraanmyne in wording geleë wees. Die beskikbaarheid van krag is reeds uit verskeie oorde as een van die knelpunte met mynwording bestempel.

Volgens die voorlegging aan die stadsraad van Arandis geniet die projek die steun van die Ministerie van Myne en Energie en van NamPower. 'n Verstandhoudingsooreenkoms is ook tussen die partye onderteken.

Die nuwe kragsentrale sal op 'n terrein van sowat 12 hektaar gebou word. 'n Belangrike vereiste is dat die perseel naby die bestaande Arandis-stasie moet wees.'n Behoorlike toegangspad is 'n vereiste. Dit sal taamlik maklik by die NamPower-netwerk moet inskakel en wateraansluitings is 'n vereiste.

Op Arandis is op munisipale vlak verklaar dat die ondernemers reeds oor die nodige oorbruggingskapitaal beskik.

'n Omvattende omgewingsopname word soos gebruiklik as voorvereiste vir die nuwe Gecko gestel.

26 May 2010

OTHER POTENTIAL USERS

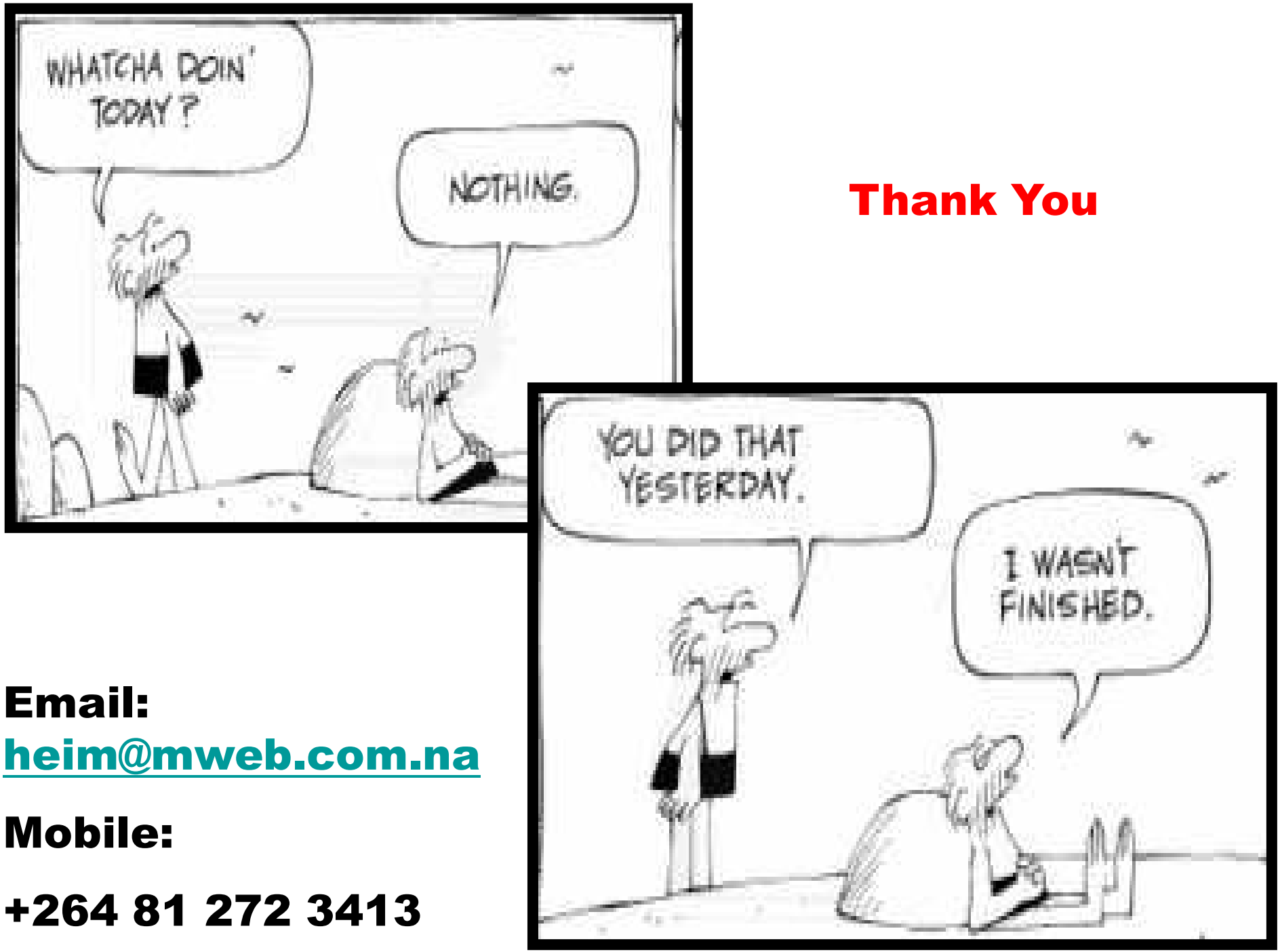
Mining Vehicles

Trains

Addition to Diesel Fuel

Export Markets

Thank You



Thank You

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