

Biofuel, Water and Biodiversity



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This presentation

- Why biofuel?
- What and where?
- Considerations
 - Water
 - Biodiversity - Sustainability
- Conclusion
- Recommendations

What is Biofuel?

- Fuel obtained from recently living organisms or parts (organic substances - Non Fossil)
- Solid, liquid, or gas fuel consisting of, or derived from biomass

Why Biofuel?

- World's energy crisis is growing
- The need to supplement the Fossil Fuels
- Environmental Friendly
 - reduction of greenhouse gas emissions
 - reduction of fossil fuel use
- Increased national energy security
- Increased rural development and
- A sustainable fuel supply for the future

In South Africa?

- Energy for all households?
- Eskom's problems?
- Provide jobs for the unemployed?
- Upliftment of the poor in the region?
- Meet 75% of the energy requirements
- Vast lands available?
- Affordability?

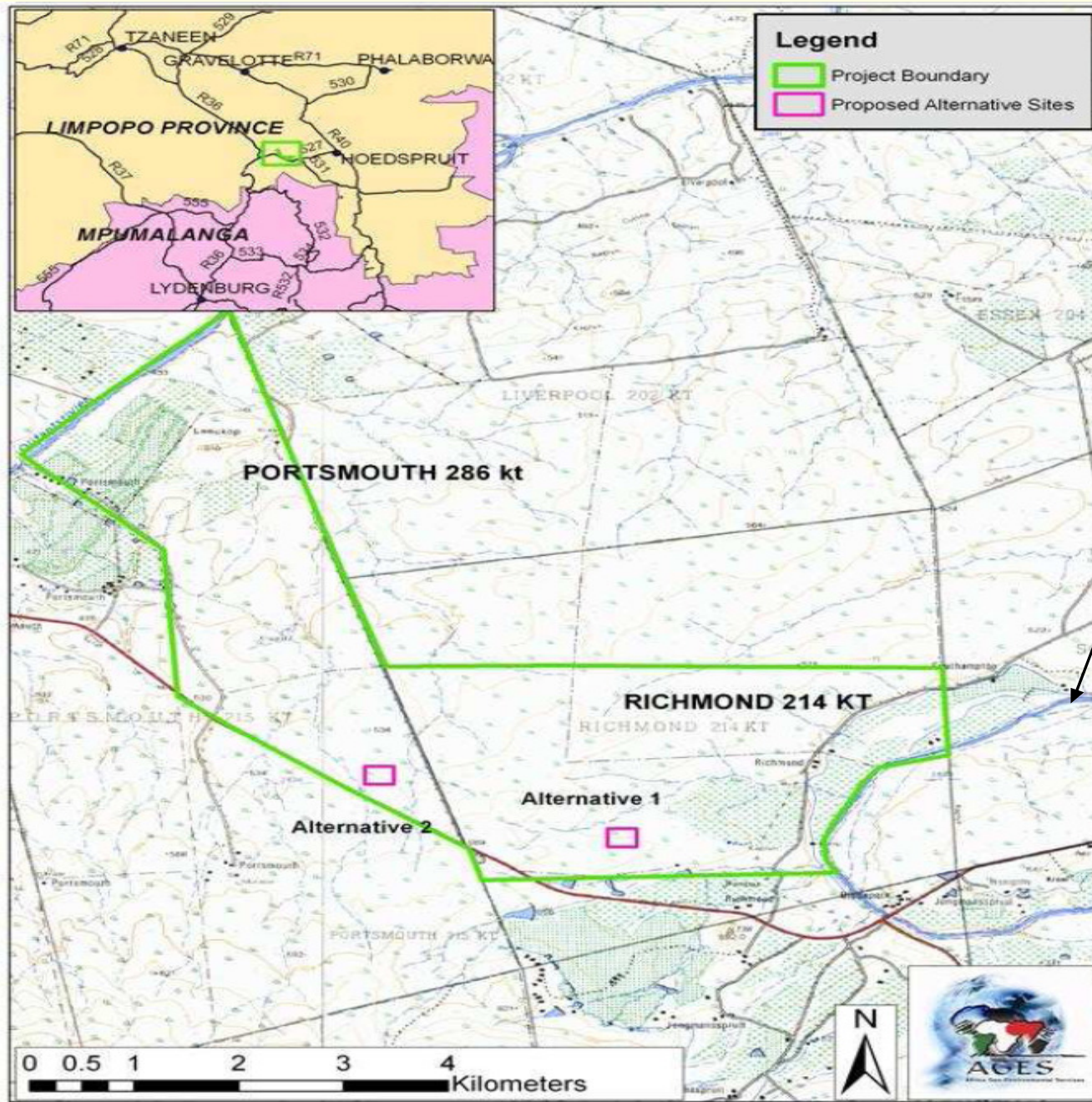


What and Where?

- **corn and soybeans** in the United States
- **rapeseed, wheat and sugar beet** primarily in Europe
- **sugar cane** in Brazil
- **palm oil** in South-East Asia and
- *jatropha* in India
- **sugar cane?** Hoedspruit, South Africa?



The proposed site(s)



Blyde

Considerations

- Not a cure-all solution
- Conditions are heterogeneous
 - population density and dynamics,
 - natural factors,
 - available infrastructure, capital and logistical restrictions

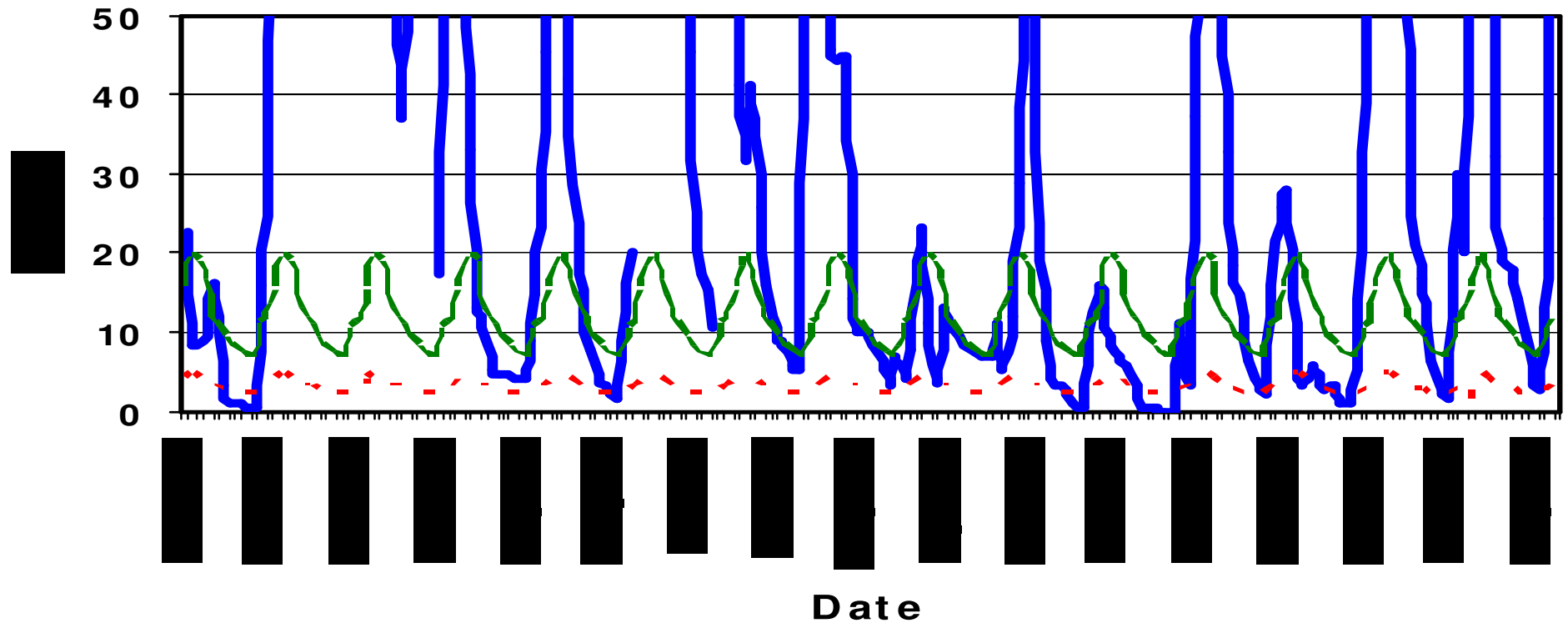
The production of fuel from sugar cane may be very beneficial to South Africa as a whole, in terms of prosperity. In fact, to say that environmental friendly fuel will benefit South Africa and Africa as a whole is superfluous. But, what will be the **cost?**

Considerations (Cont'd)

- Some believe it is more expensive than using fossil fuel
- One of the thirstiest crops in the world
- 100 tons of Water = 1 ton of Sugar
- Rainfed? May rely on expensive Irrigation system
- Hoedspruit/Olifants south region rainfall 450 mm/a
- Olifants in a deficit of 200m m³ (Blyde – lifeblood)

Flows at Mamba (Olifants)

Mamba Olifants River



Water Availability



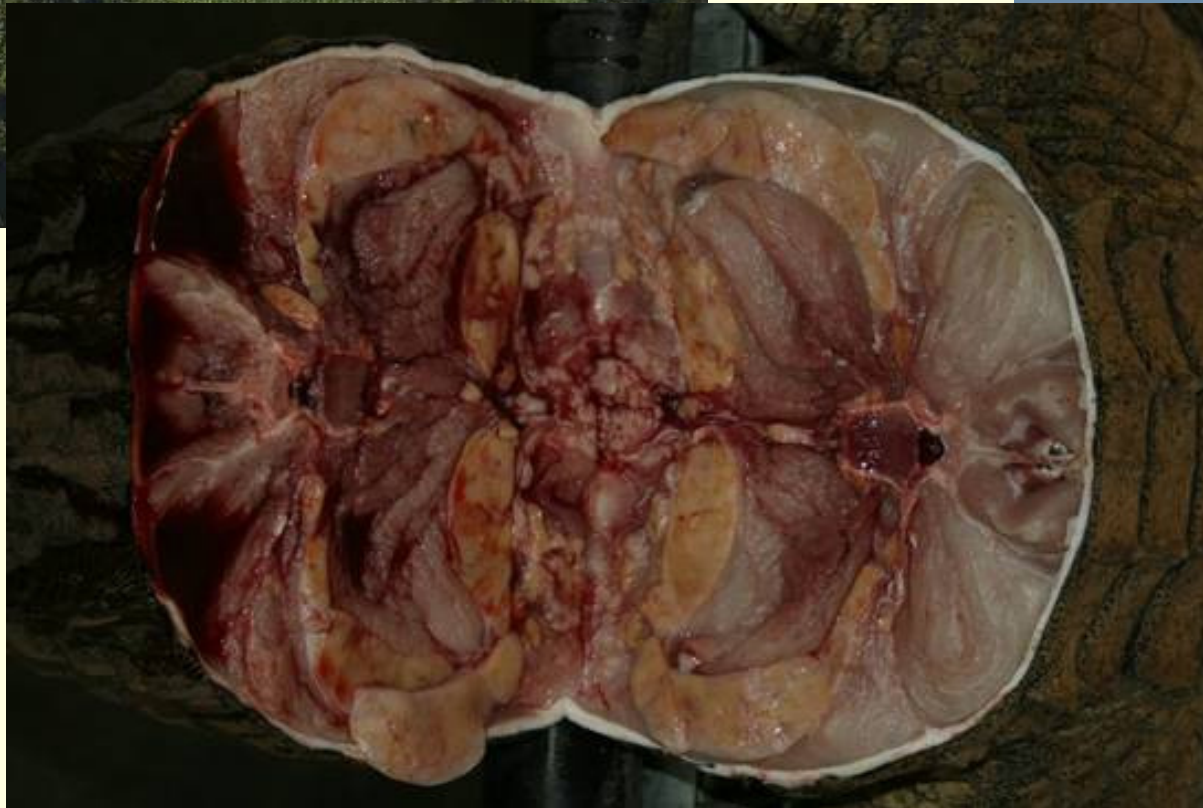
Is it going to be sustainable?- biodiversity

- Water for domestic activities
- Water for the RESERVE?
- KNP and Conservation and Tourism?
- International obligations?
- "Where will the water to grow the food needed to feed a growing population come from if more and more water is diverted to crops for biofuels production?"
- "the growth and production of biofuel crops in high rainfall areas will impact on other water resource users and could only be permitted where water was available" – DWAF 2007

Sustainable? - biodiversity

- KNP's mandate to protect biodiversity? If ...
- Blyde Dam's water is re-allocated to a 10 000 ha sugar cane irrigation project for ethanol production
- Land use changes such as extensive crop establishment of this nature can result in disturbance to flow patterns and damage to riparian zones and wetlands
- Water Quality
- The expansion of sugar cane in the Hoedspruit area: negative impact on aquatic habitat because of water scarcity and water quality.
- Preparation for planting will affect the quality of the water resources and even worse if the project is abandoned

Water Quality Problems



Adverse impacts



The "food vs fuel" debate

- Food security is a basic human need which should not be compromised by bioenergy development
- Due to rising demand for biofuels, farmers worldwide have an increased economic incentive to grow crops for biofuel production instead of food production
- Without political intervention, this could lead to reduced food production and increased food prices and inflation
- The impacts of this would be greatest on poor



Population increase

- Food production will need to increase
- water consumption will increase dramatically in the agriculture sector and biofuels will increase
 - This doesn't add up for the water perspective
- Sunita Narain at the Stockholm 2007...

"good as an idea, bad in practice"

DWA

- DWA Mpumalanga Regional Office (RO) received two licence applications related to the project, one for the plant and one for the feedstock production.
- An EIA report has also been submitted to the RO for comments
- DWA does not support the project due to insufficient water resources in the catchment.

Alternatives?

- “The alien invasive Nypa palm (*Nypa fruticans*) - Nigeria produce far greater bio-fuel per hectare than sugar cane” Eniang (2008)
- “Invasive species like Mategene weed (*Lantana camara*)
- Water Hyacinth (*Eichornis gracipes*) can be converted into bio-fuels without undue stress on human foods”
- Assorted seeds from industrial forest plantations e.g. Gmelina (*Gmelina arborea*) yield enormous amounts of seeds per hectare per season that can be collected and processed into bio-fuels,
- Use of crop residues as well as biogas from Animal and Human wastes to supplement our energy needs

Conclusions

- There is great potential for the effective introduction of biofuel to South Africa
- Bioenergy also offers significant opportunities to improve sustainable development, especially in smaller scale rural areas
- There are clearly good long-term prospects, though policy-makers must first be informed of the practical requirements, the potential for an affordable energy supply, and the **barriers that will need to be overcome**
- Research on sustainable bioenergy systems is a very young science, so that few studies and empirical, field-derived data are not available as yet, especially in Southern Africa
- This applies even more to sustainability issues of bioenergy in developing countries, where semi-arid, arid and tropical climates restrict the application of results from countries, which have different soils and climates and use different farming systems

Conclusions (cont'd)

- International experience in this regard is a vital issue and should be carefully considered to avoid committing resources for the support of an ill-conceived approach
- The plight of KNP should be put high on the agenda
- Alternative crops that have little impact on the biodiversity with reference to water requirements should be investigated
- *Principles: Integration, accountability, transparency, full accounting, informed decision-making*

Thank You

