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BEFS Module 2 - Techno-economic analysis on the production of biofuels

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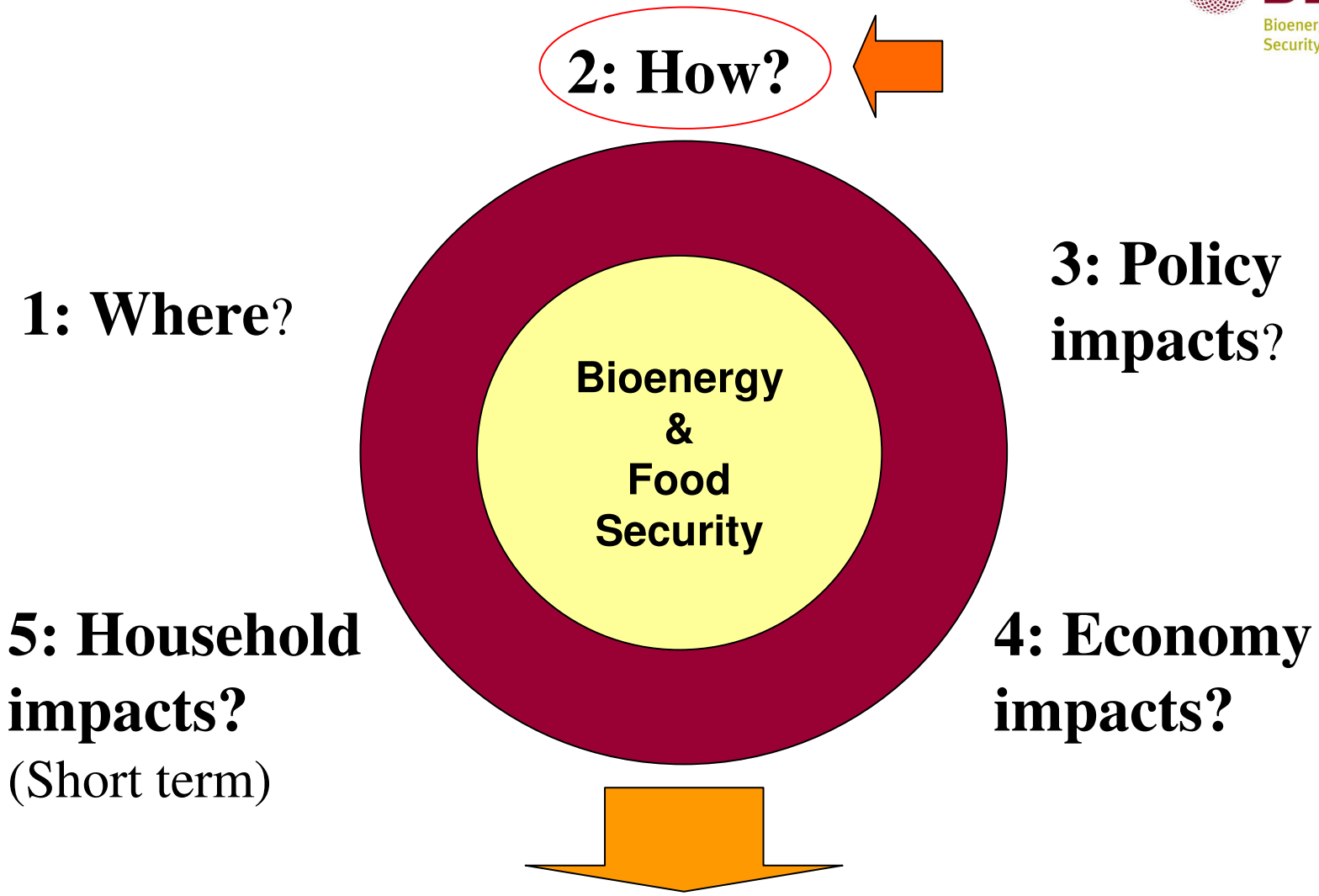
BEFS Analytical Framework



Module 2: Key questions

Now that we have seen which areas have potential....

- **Can biofuels be produced profitable in Tanzania?**

- **Can biofuels be profitable with smallholders participation?**

Module 2 - Steps

No biofuel production in Tanzania today

- **Is the country capable to produce biofuels?**

If yes...

- **At what production cost?**

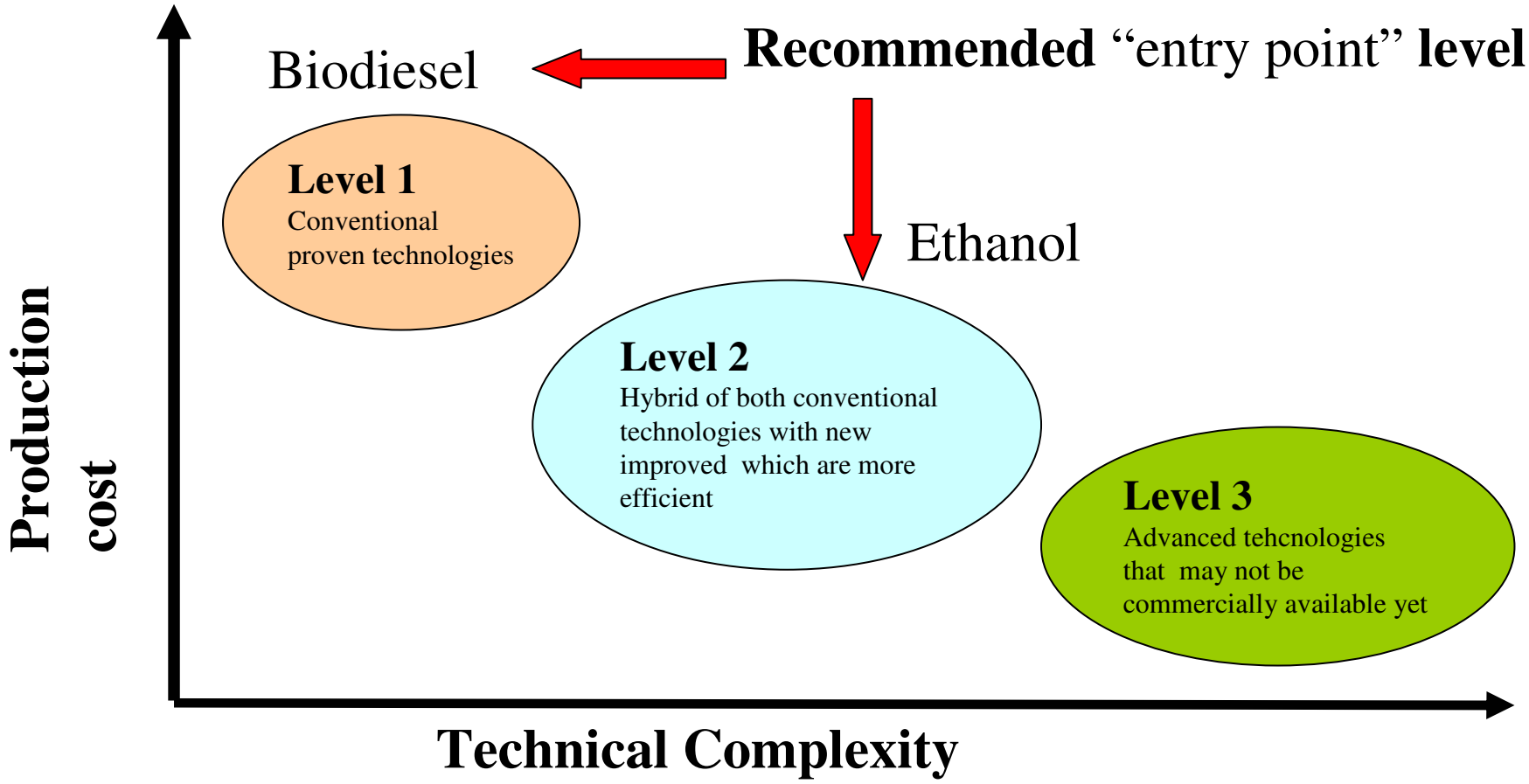
  Based on:

  - **feedstock choice**
  - **feedstock production set up**
  - **Industrial biofuel conversion technology level**
  - **Industrial biofuel conversion set up**
  - **Co-products income**

Feedstock

Biofuel	Feedstock choice	Production options
Ethanol	Sugarcane Molasses Cassava	Outgrower only or Estate only or Mix outgrower/Estate
Biodiesel	Jatropha Oil palm	

Industrial biofuel production technology level



Industrial biofuel conversion set up

Configuration	Production Capacity
Stand alone facilities (i.e. ethanol only)	Million liters per year
Integrated facilities (i.e. sugar and ethanol production at same site)	

Biofuel production cost scenarios

Feedstock	Feedstock Origin	Industrial Configuration	Numbers of Scenarios
Sugar cane	Outgrowers/Estate/Mix	Stand alone/integrated facility; technology level; capacity; by-products processing	4
Molasses	Existing sugar factories	Stand alone/integrated facility; technology level; capacity; by-products processing	2
Cassava (fresh and dried)	Outgrowers/Estate//Mix	Stand alone; technology level; capacity; by-products processing	3
Oil palm	Outgrowers	Stand alone; technology level; capacity; by-products processing	1
Jatropha	Outgrowers/Estate//Mix	Integrated; technology level; capacity; by-products processing	3

Results – Biofuel production costs

Under recomended technology and no co-product credits

Biofuel	Biofuel Production Cost in Tanzania (USD/litre)	Other Biofuel Production Costs in the World (USD/litre)
Ethanol from sugar cane	0.49-0.68	Brazil / Colombia: 0.27 - 0.30 India: 0.48 - 0.55 EU: 0.76 - 0.78*
Ethanol from molasses	0.62-0.74	Brazil, India Thailand and South Africa < 0.60 USA: 0.60 – 0.70
Ethanol from cassava	0.37-0.47	Thailand and Vietnam: 0.34 - 0.40 Brazil: 0.45 -0.47 China and India: 0.60 - 0.65
Biodiesel from oil palm	0.83	Malaysia: 0.38 – 0.69
Biodiesel from Jatropha	0.74- 0.96	India: 0.60 Zambia: 0.95 Mozambique: 0.78

* may include use of sugar from beets

Module 2 - Techno-economic analysis

Information on **biofuel production cost** can help:

- Assess competitiveness of domestic biofuel production with fossil fuels
- Assess competitiveness of domestic biofuel production on international market
- Identify needs for sector support

Assessing competitiveness of ethanol on the national market USD per litre

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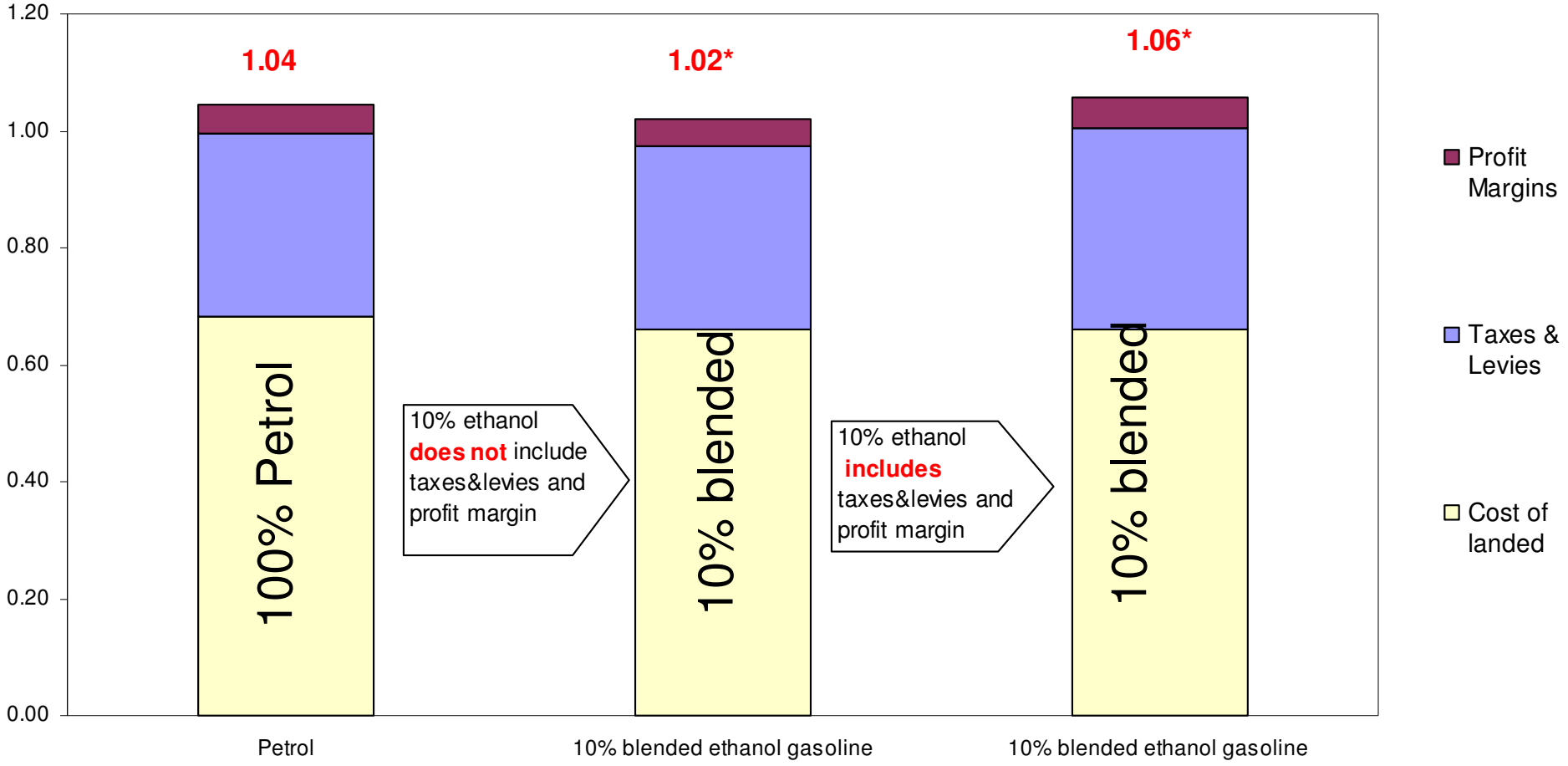
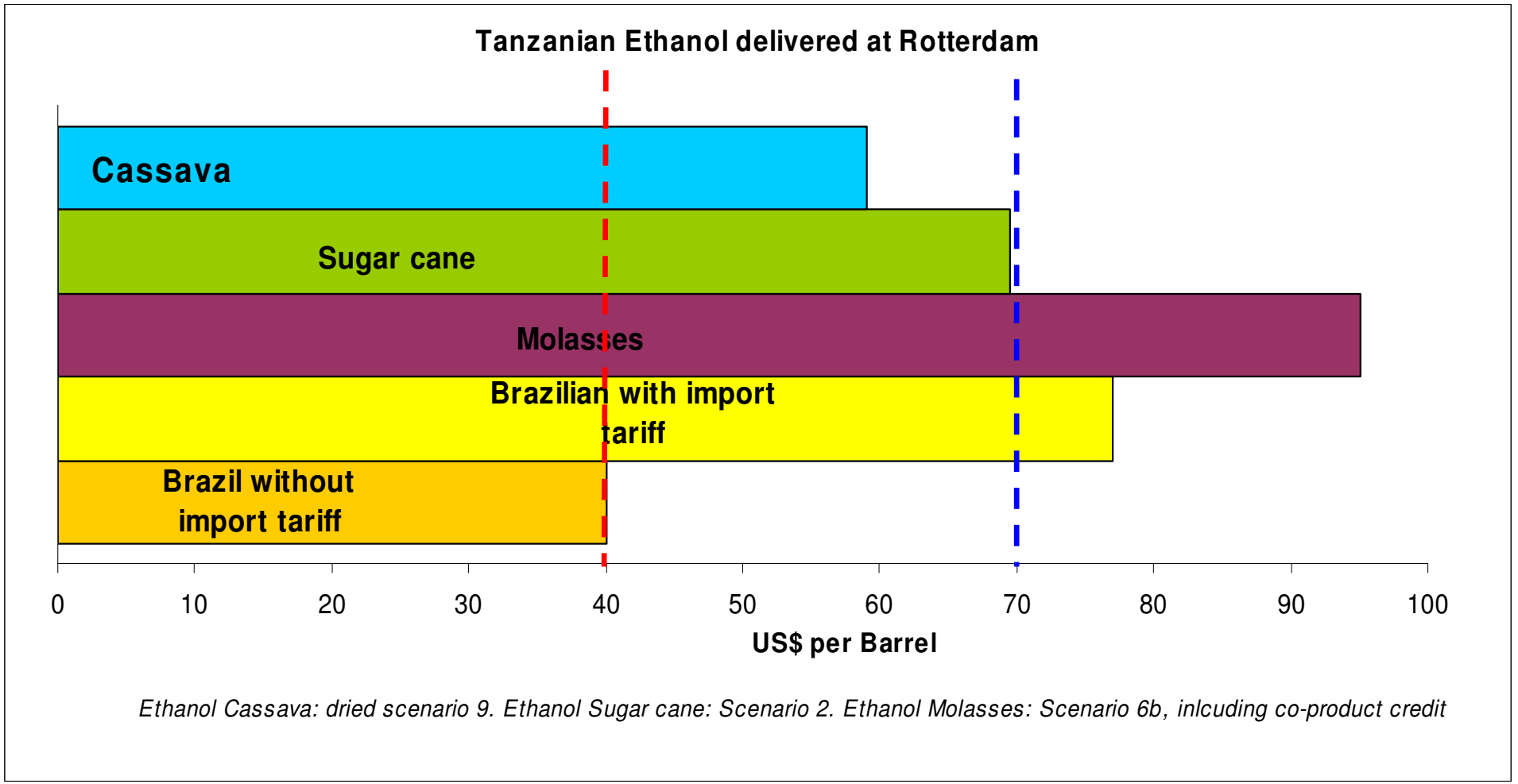


*Based on average ethanol production cost in Tanzania

Tanzanian ethanol delivered at Rotterdam port USD per barrel



Ethanol Cassava: dried scenario 9. Ethanol Sugar cane: Scenario 2. Ethanol Molasses: Scenario 6b, inlcuding co-product credit

Policy implications

Co-product market development

- Electricity from co-products
- Organic fertilisers

Increase in yield

- Research into better varieties
- Improved farming technology/services/infrastructure
- Promote block farming and institutional support to smallholder farmers

Human capital

- Development of human capital

Policy interventions

- Introduce a blending mandate to stimulate the Biofuels industry
- Fiscal incentives for producers and consumers (i.e. VAT)
- Special incentives/support for integrating outgrowers

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THANK YOU!

www.fao.org/bioenergy/foodsecurity/befs

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Feedstock	Today	Future
Food	10	100
Potential	200	DIFFERENCE = 100