

**UNCTAD**

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**Extractive Industries and Sustainable Job Creation**

**Story of Successful, Sustainable Green Business Model**

By

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Kenana Sugar Company Ltd., Republic of the Sudan

The views expressed are those of the author and do not necessarily reflect  
the views of UNCTAD.



Kenana Sugar Company Ltd.

# Story of Successful, Sustainable Green Business Model

By

Hassan Hashim Erwa



Cubic Globe



# Presentation Outlines

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Sudan Sugar  
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Kenana Business  
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2. Sudan Sugar Production
3. Kenana Business Model
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# About Sudan



# Sudan – A Resource Basket

## About Sudan

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## Agriculture

- Priority sector for Govt
- Growth in contribution to GDP  
3x from 1986 to 2006

## Land

- 3rd largest African country-1.8 mn.sq.mt
- 57% land suitable for agriculture (only 8.5% cultivated)

## Soil and climate

- Arable land – sandy, clay, laterite, alluvial
- Suitable temperature and humidity

## Ample water supply

- 4,100 cubic metre per person pa
- Rainfall (average), rivers (White Nile & Blue Nile) and underground water



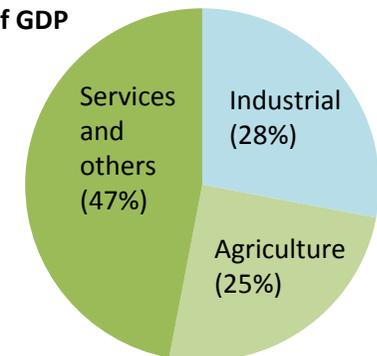
Population : 34 million

Population growth : 2% pa

Nominal GDP : US\$ 56 billion

GDP growth in 2011 : -3%

% of GDP





# Sudan Sugar Production



# Sudan – Sugar Production

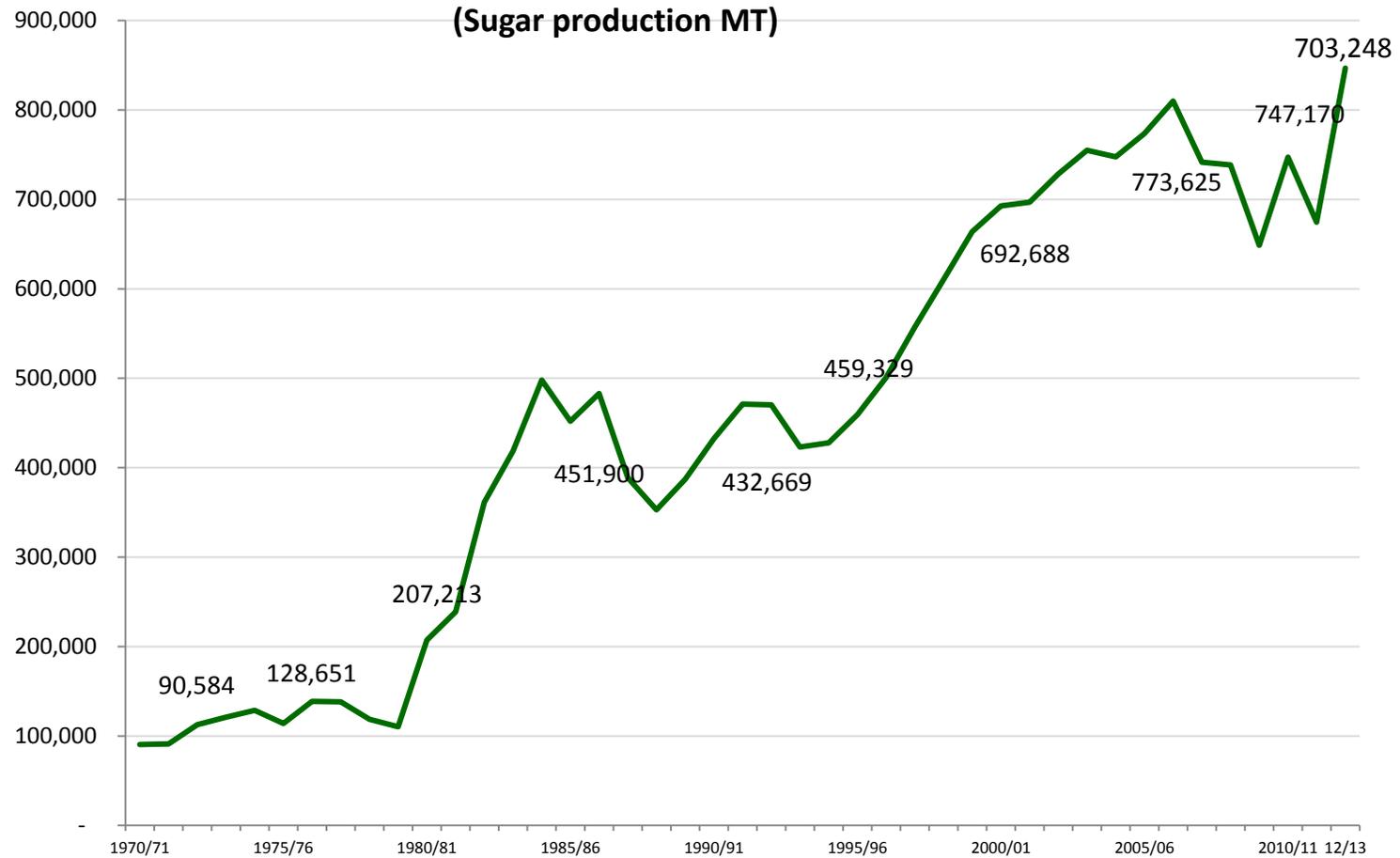
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# Kenana Business Model



# Kenana Sugar Company

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## KSC Vision

The renewable green source of food  
and energy.





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## KSC Mission

Cane & sugar production

Integrated production  
of food products

Bio fuels production

Knowledge leader in technical solutions  
& project delivery partnership

Engineering, fabrication  
& erection

Sustainable integrated solutions  
for agribusiness

Leader in the development of  
agricultural projects in Sudan,

Social and development  
dimensions

Massive green  
environment enhancer





# History of Innovation and Achievements

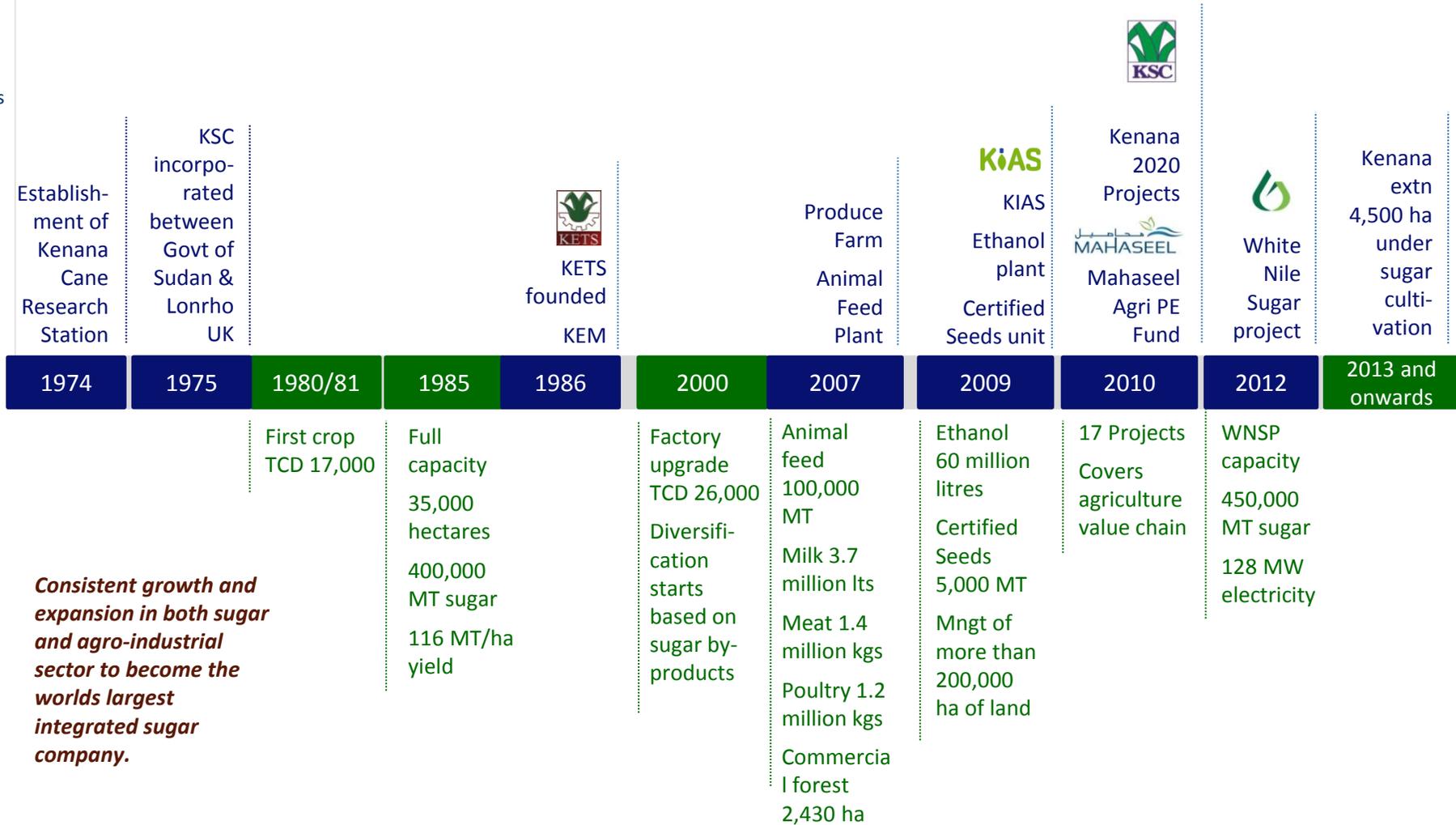
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**Consistent growth and expansion in both sugar and agro-industrial sector to become the worlds largest integrated sugar company.**



# Kenana Sugar Cane Model

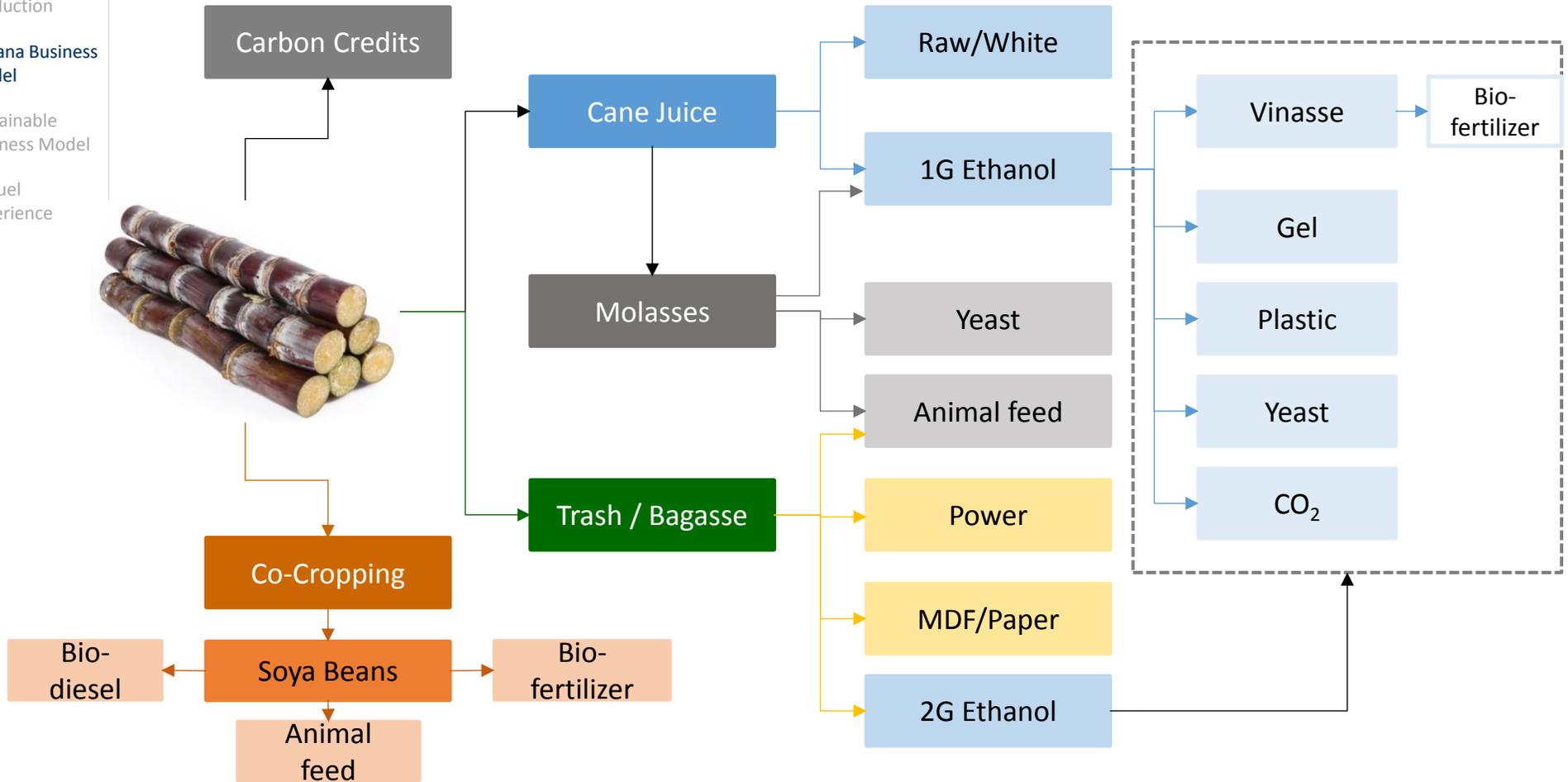
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# Sustainable Business Model



# Sustainable Business Model

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## Kenana renewable devplmnt. Role

*KSC project is the largest integrated sugar project in Sudan which played great role in Sudan economic development in many areas such as:*





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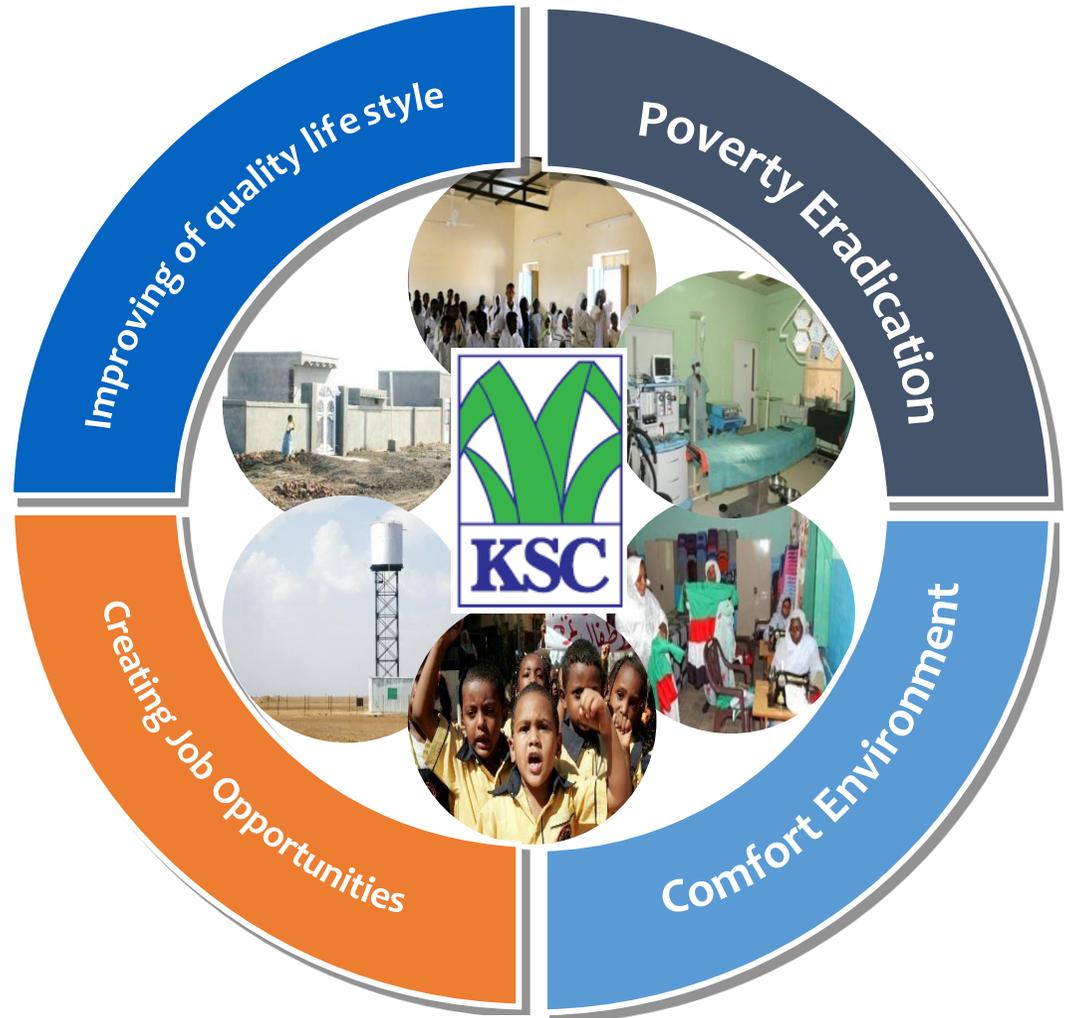
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## **KSC great role in social devlpmnt.**

*KSC played a unique role in social development at KSC site, and it made a tremendous change in both rural & urban areas.*

**KSC provided the population with different specialties and a huge amount of services and comfort life. Such as**





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**Sustainable and socially responsible operations**

**Kenana site**

**> 84,000  
By KSC 2020  
(17 projects)**

<b>People</b>	<b>&gt; 4,000</b> in full time employment	<b>&gt; 7,000</b> in part time employment	<b>&gt; 30,000</b> people in Kenana estate
<b>Education &amp; learning</b>	<b>58</b> schools and learning institutes at Kenana site	<b>11,500</b> children under education (primary & secondary)	<b>8</b> libraries and sport facilities
<b>Infrastructure</b> <i>(Site and agricultural villages)</i>	<b>Township with Power (3.5MW)</b> regular supply of power	<b>Water Treatment (4.4M m<sup>3</sup>)</b> provides drinking water	<b>12 Hospitals &amp; Clinics</b> catering to more than 140,000 patients annually
<b>Environment</b>	<b>4,500 ha</b> under commercial forest	<b>Cane fields</b> effect the entire eco-system	<b>Economical solution</b> to combat desertification



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**Economy at large**

<b><i>Positive impact on the economy</i></b>	<b>30%</b> contribution to Govt. taxes & duties	<b>Port activity</b> products / inputs export / import	<b>GDP</b> contribution
<b><i>Livelihood of communities in adjoining estates</i></b>	<b>Better</b> standard of living	<b>Low</b> infant mortality rate	<b>Higher</b> per capita income
<b><i>Adjoining villages and communities</i></b>	<b>Hospitals &amp; Clinics</b> built for general public use	<b>Water Treatment Plant</b> Supplied and erected for general public use	<b>Schools</b> Primary & secondary school built
<b><i>Industries that benefit from Kenana</i></b>	<b>Transport and logistics</b> (road, rail & air)	<b>Contractors and services providers</b>	<b>Suppliers of equipment &amp; machinery</b>



# Corporate Social Responsibility

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## KSC great role in social devlpmnt.

*Ministry of health conducted comparison studies for sugar factory areas to measure the human development average combined with other areas in Sudan.*

Indicator	Sudan average	Sugar industry areas
Deaths of children under 5 year-old (every thousand)	104	10
Deaths of Moms giving birth	59.9	14
Assimilation in Elementary education	%63	%95
completion of elementary schools	%84	%90
Assimilation in High school education	%79.5	%95

***The Study was conducted by specialists center's such as University of Khartoum and Beheiry center confirmed social stability on Sugar industry areas because of the availability of essential services.***



# Sustainable Business Model

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**KSC great role  
in social  
devlpmnt.**

KSC contributed to push and embrace **the rural manufacturing development** project and continued its role by supporting poverty eradication with supporting families with limited low income in rural areas. Also by helping them produce the Eucalyptus oil that have high economic value, therefore they would benefit from the Eucalyptus trees that exists around the factory.





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**KSC great role  
in social  
devlpmnt.**

The strategic partnership and projects was  
relied on:

**Value chain  
concept**

**Fair trade  
concept**



These two concepts was adopted for the  
**eucalyptus oil** projects and **graduates projects  
for fattening.**



# Sustainable Business Model

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**KSC great role  
in social  
devlpmnt.**

- **A cross-cane fields stretching commercial forest safety in confronting the desertification.**
- **Restore the rainforest ecosystems in areas adjacent to restore vegetation to reverse desertification.**
- **Reduce the temperature an average of 2°C in the factory locations and impact positively on the environment and reduce losses from evaporation**



# Kenana Biofuel Experience



# Key Market Drivers

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- EU (RED) and USA Regulations.
- Energy security.
- Climate changes.
- Economic viability.



# Inputs of Ethanol Production

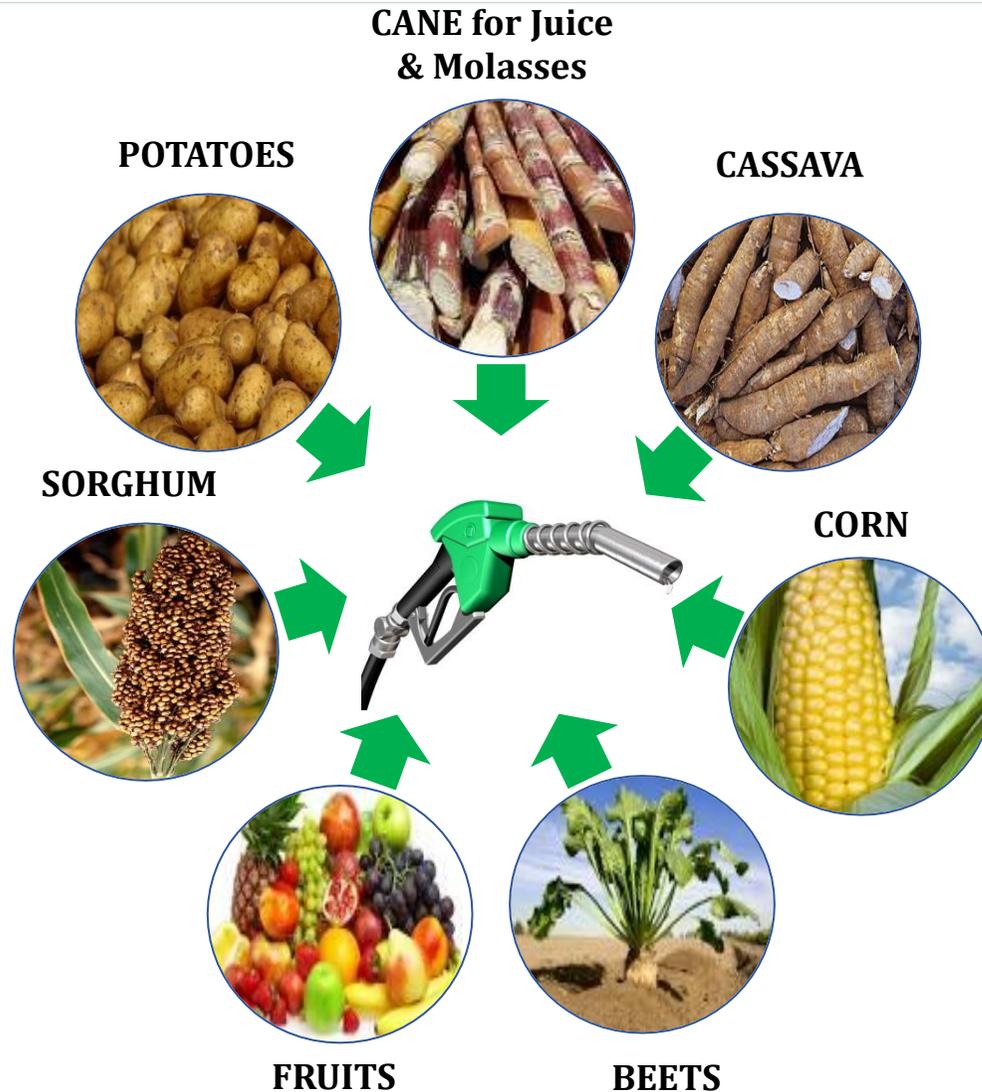
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# Ethanol Feedstock Mix 2012

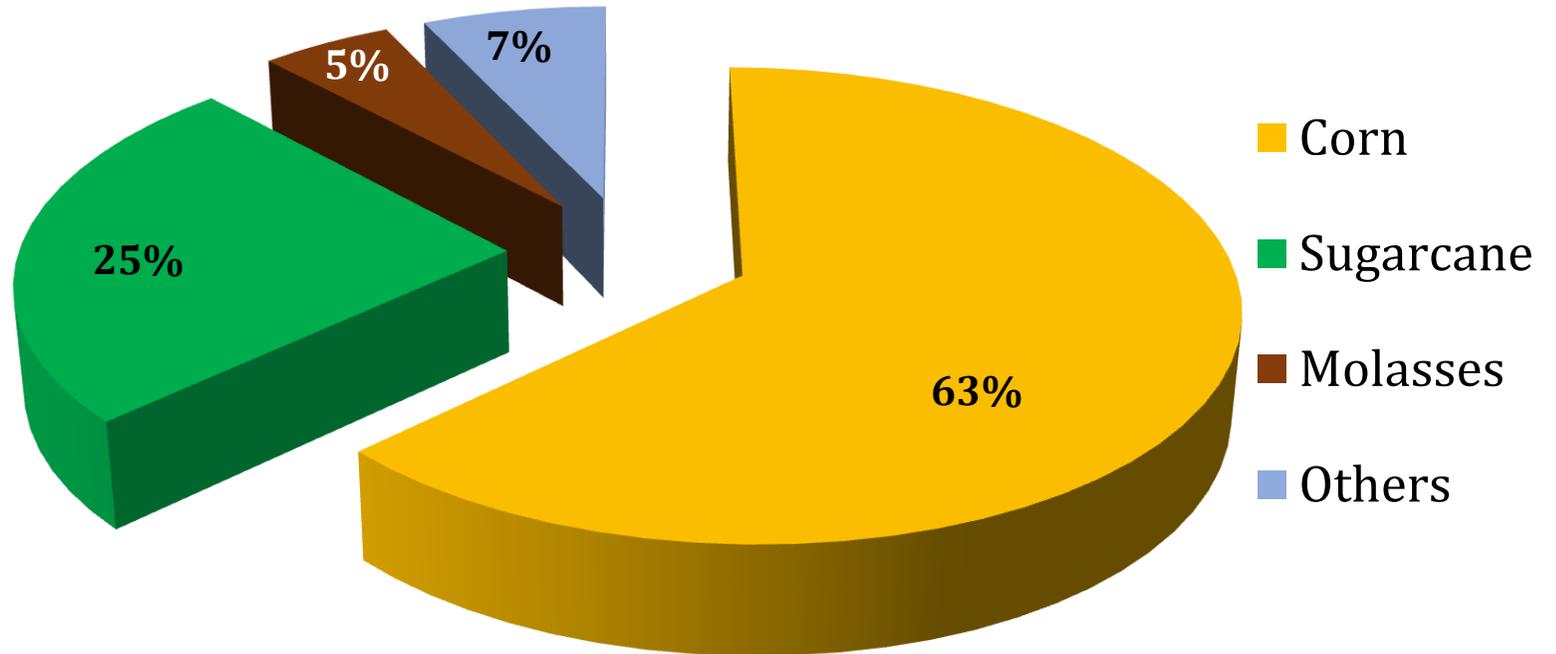
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# Ethanol Fuel: Effectiveness

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- Ethanol is considered one of the most efficient fuels.
- Produces no polluting gasses, or gum residues upon combustion in motor engines.
- It suites all requirements of steam pressures for vehicle usage in cold or warm countries.
- E-10 achieves 91 Octane No. and E-85 achieves up to 105 Octane No.
- The conventional vehicles can run on blended Ethanol-gasoline without modification of the engines up to 25% Ethanol (E-25).
- For higher blending ratios up to E-85, flexi engines are required.



# Ethanol Fuel: Oil Vs Ethanol Risk Analysis

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Comparison	Oil	Biofuels
Energy Security Risk	High	Low
Cost per Mile	Med	Low
Infrastructure Cost	Very Low	Low
Technology Risk	Very Low	Low
Environmental Cost	Very High	Low
Implementation Risk	Very Low	Low



# Ethanol Fuel: World Ethanol (mln litre)

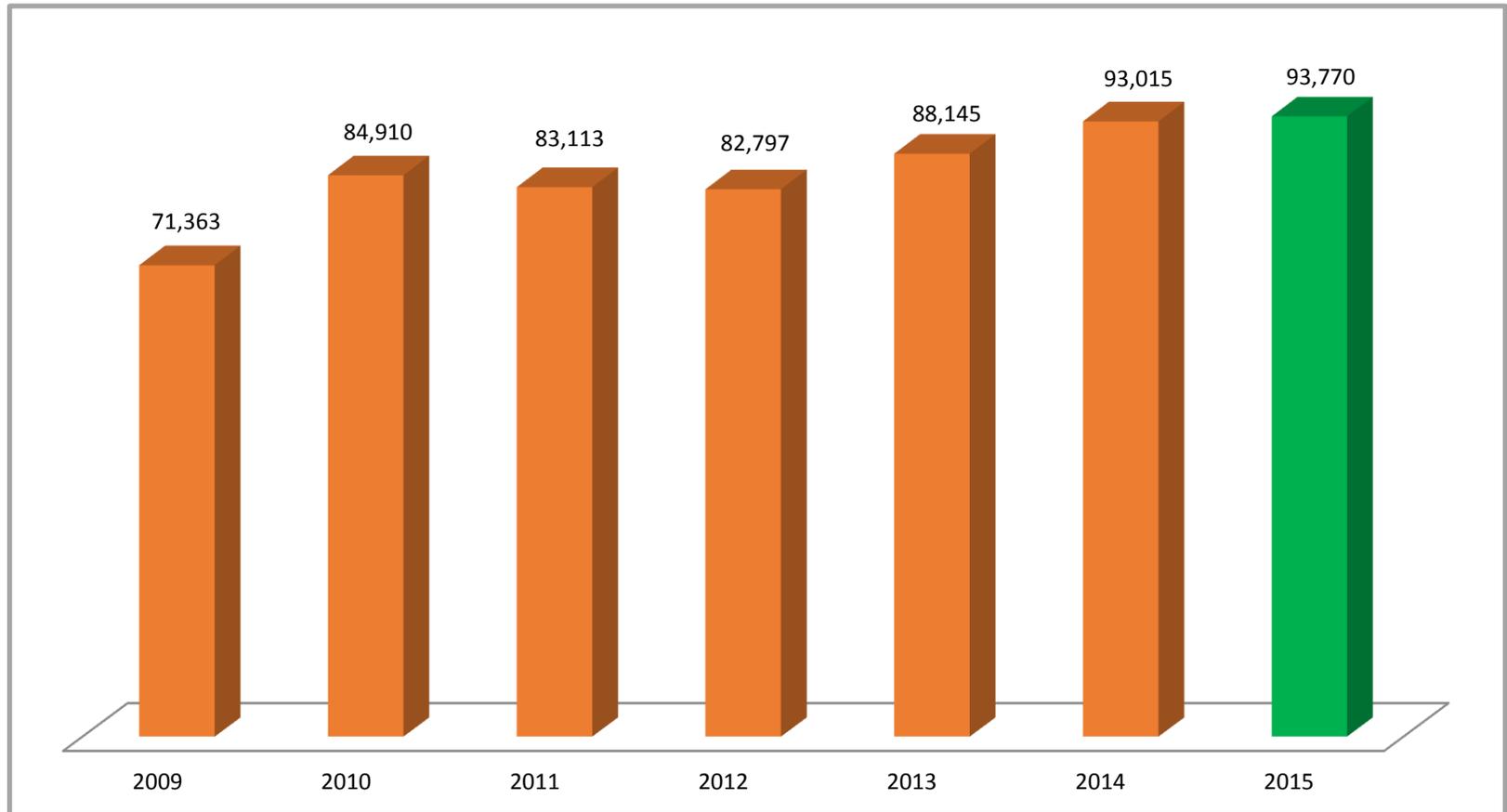
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# Ethanol Fuel: World Ethanol (mln litre)

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## Ethanol Blending Ratio

Country	Blend %
Brazil	25– 85
Central America	5 – 25
Canada	10
EU	5 – 10
USA	10 – 25
India	5 – 10
China	10



# Success Factors for Bio-Fuels in Sudan

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**Feedstock**



**Technology**

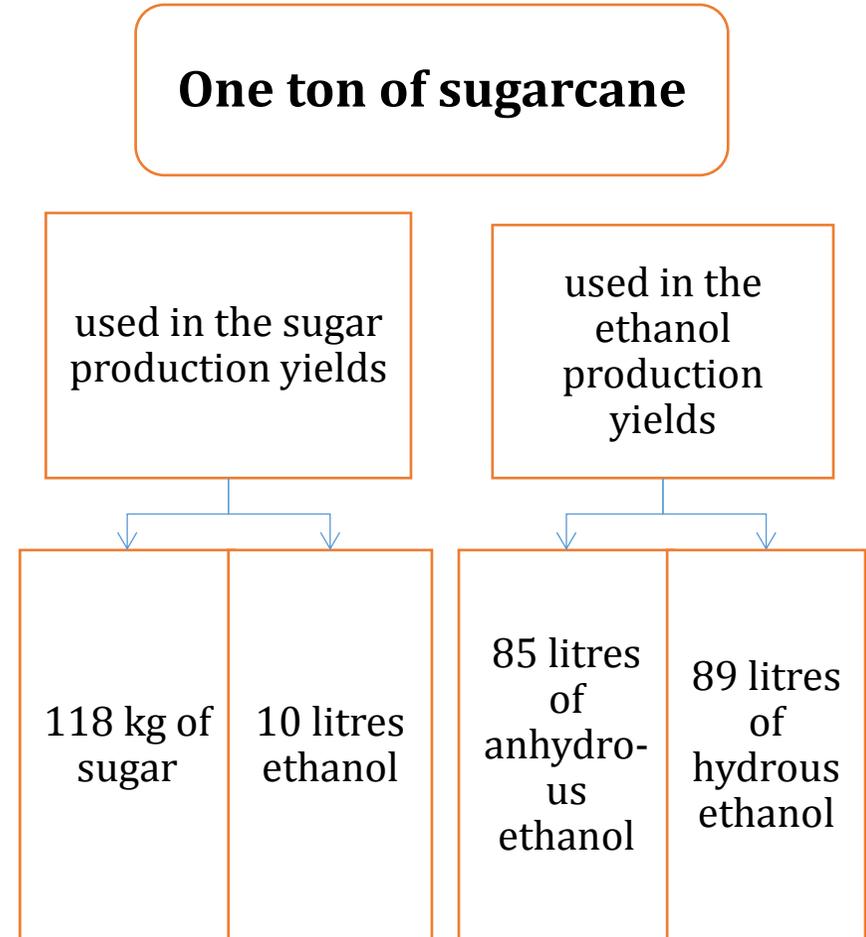


**Policy**





- Ethanol is produced in large quantities by fermenting sugar.
- The molasses is approximately 50% sugar content that may be directly fermented.
- An average of 360 kg molasses produce 100 liters of Ethanol.
- This means approximately 270 liters of Ethanol per MT of molasses.





# Ethanol from Sugarcane

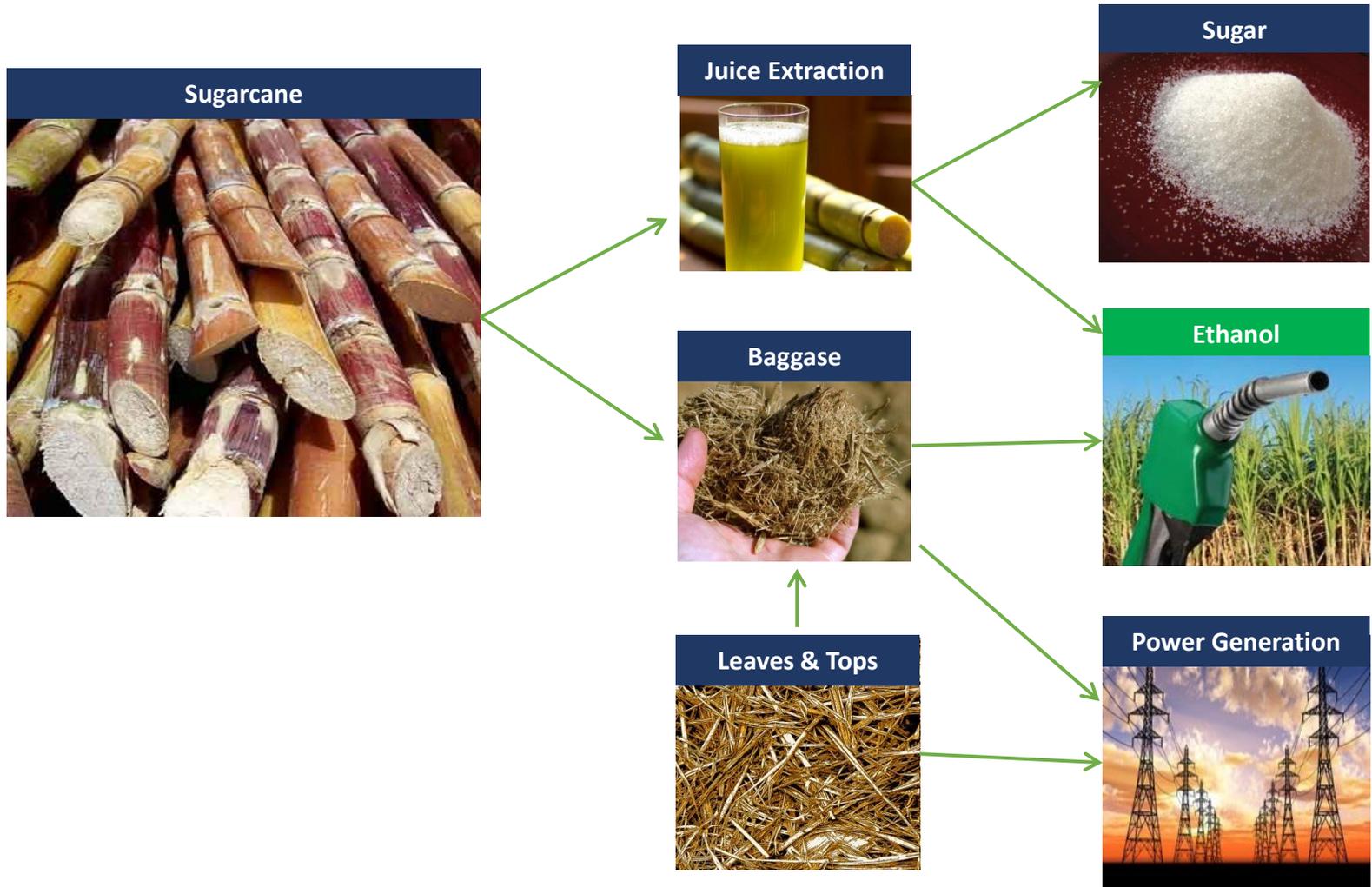
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# Ethanol Technology

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- Feasibility study by Techserve, South Africa.
- Manufactured & supplied by Dedini of Brazil (January – August 2009).
- Erected by Kenana Equipment Manufacture Business Unit (KEM).
- Commissioned in June 2009.

- Installed capacity 200,000 litres Ethanol per day; 65 million litres Ethanol per year.
- Produces anhydrous Ethanol with a purity of 99.8% w/w.
- Ethanol specification supersedes EU Standards (EN 15376:2007).





# Ethanol Technology

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➤ Daily Production Rate

200,000 Litres

➤ Ethanol Annual Production

65 million Litres

➤ Ethanol By-products

- 2nd Grade Alcohol
- Fusel Oil
- Yeast





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# Ethanol-benzene Blending Mandate

- Sudan Government has mandated blending of Ethanol-Benzene through Council of Ministers in March 2008.
- **Ethanol Bill** of blending ethanol into benzene has been set by a committee consisted of *KSC, Ministry of Industry, Ministry of Petroleum, GIAD* and *SSMO*.
- Ethanol Bill has reviewed by the *Ministry of Justice*.
- Next step for the bill is to be approved by *Parliament*.





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# Ethanol-benzene Blending Mandate

## Factors of Success

- Political Will
- Government support (Subsidies, tax exemption).
- Enhancing agricultural productivity through investments.
- Improving distribution infrastructure.
- Commitment of Oil Distribution Companies.
- Price Factor (monthly revision of the Benzene price).
- Acceptance of the public (End Users).





# Kenana Plans for Ethanol

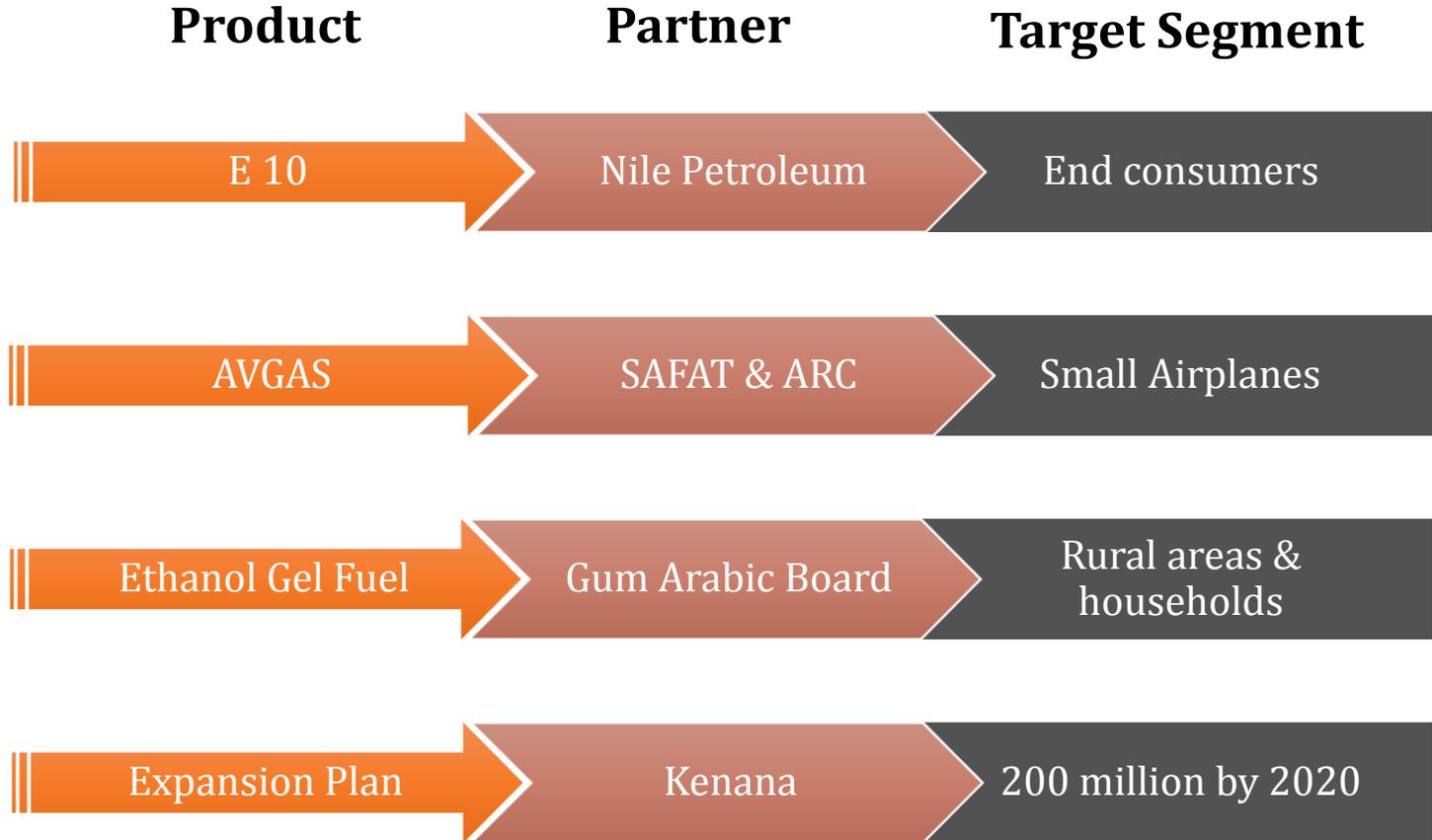
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**Policy**





# Nile Ultra E-10 (2010)

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# Nile Ultra E-10 (2010)

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# Kenana

Kenana Sugar Company Limited

RENEWABLE GREEN SOURCE OF FOOD & ENERGY



# كنانة

شركة سكر كنانة المحدودة

مصدر أخضر متجدد للغذاء والطاقة



Certified Seeds BU



KIAS



KEM BU



KETS



Produce Farm BU



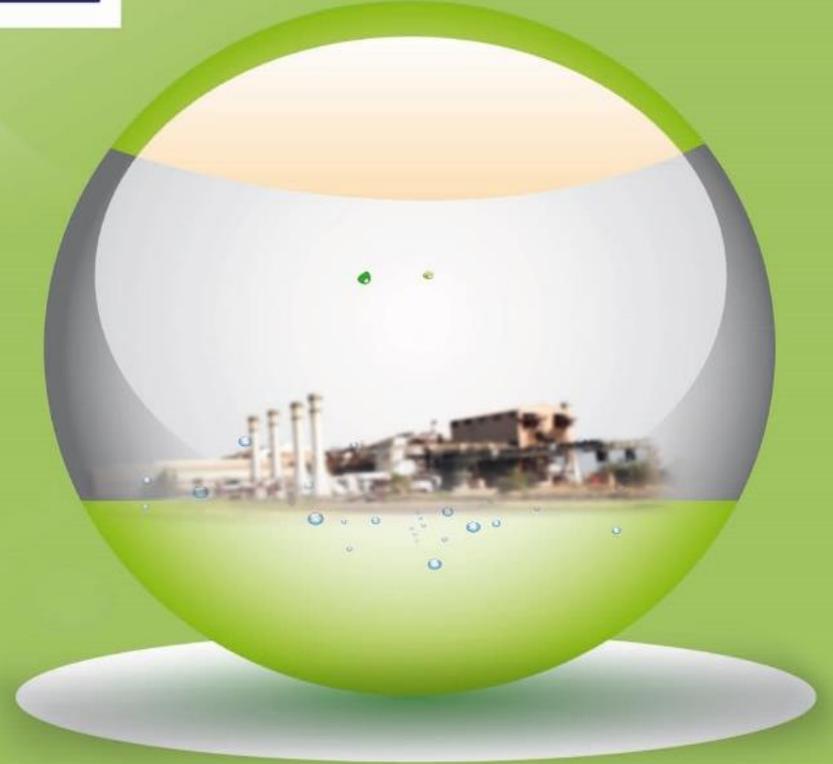
Ethanol BU



Animal Feed BU



Sugar BU



مصدر أخضر متجدد للغذاء والطاقة  
Renewable Green Source of Food & Energy



# Thank You

مصدر أخضر متجدد للغذاء والطاقة  
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