

A PERSPECTIVE OF ENVIRONMENTAL BENEFITS OF SUGAR INDUSTRIES

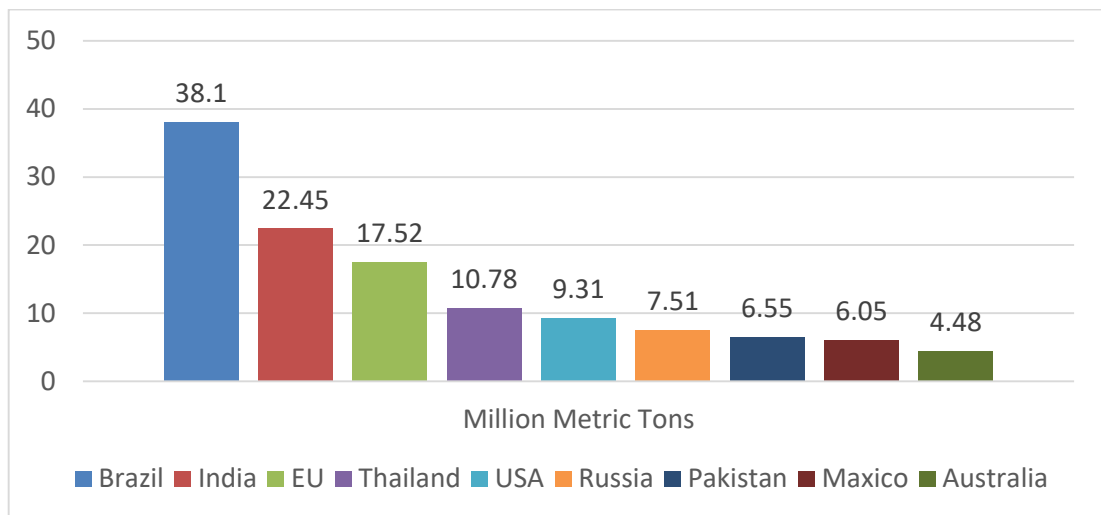
By

Dr. Shaukat Ali Mazari

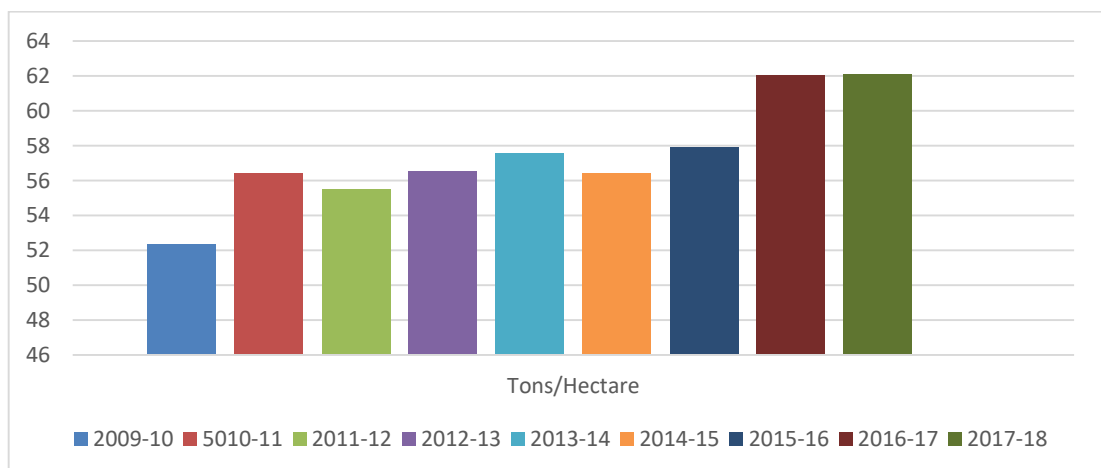
Director Postgraduate Studies

Assistant Professor of Chemical Engineering, DUET

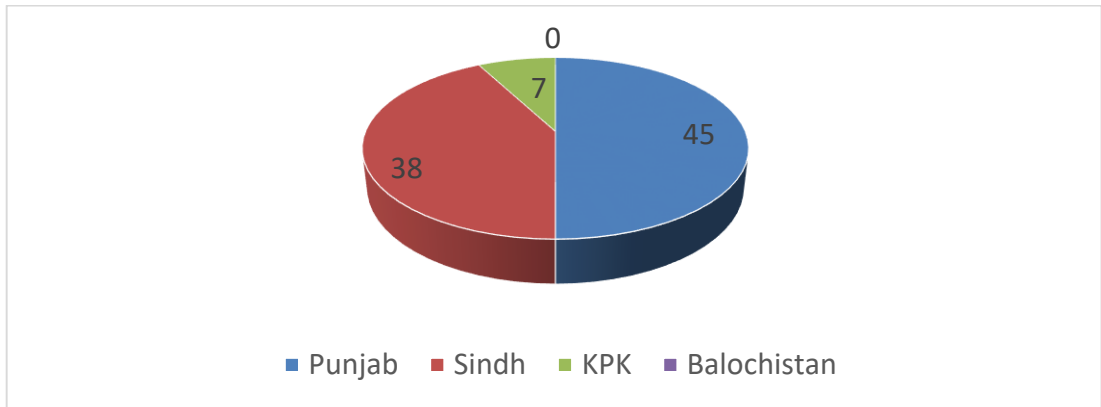
Top 10 Sugar Producers



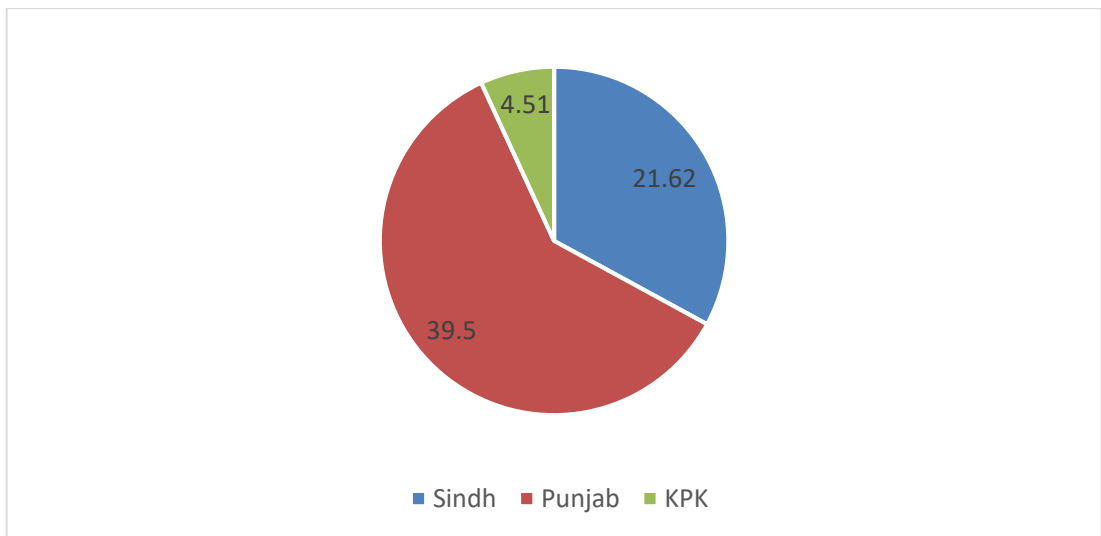
Pakistan Sugar Yield per Hectare



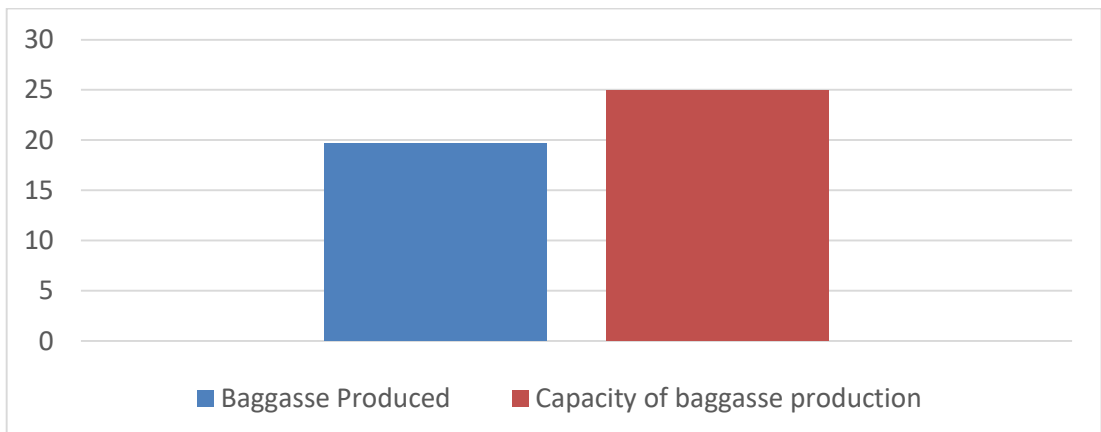
Sugar Mills in Pakistan



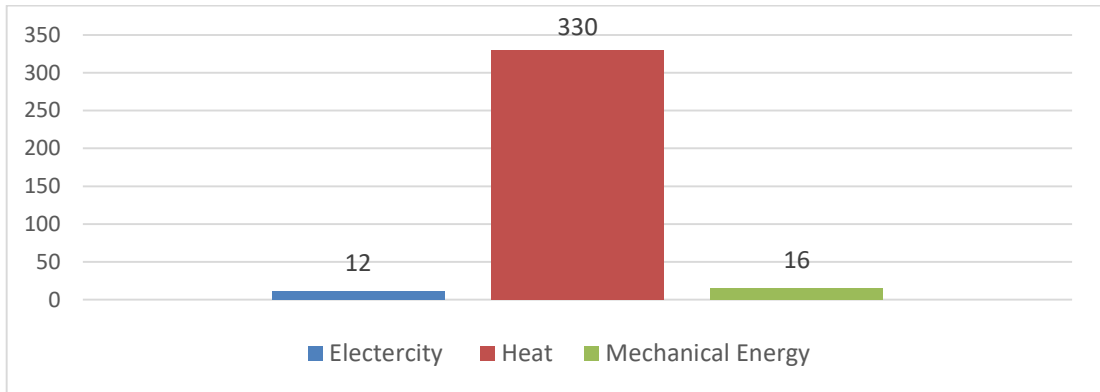
Cane Crushed in Pakistan in 2017-18 (MM Tons)



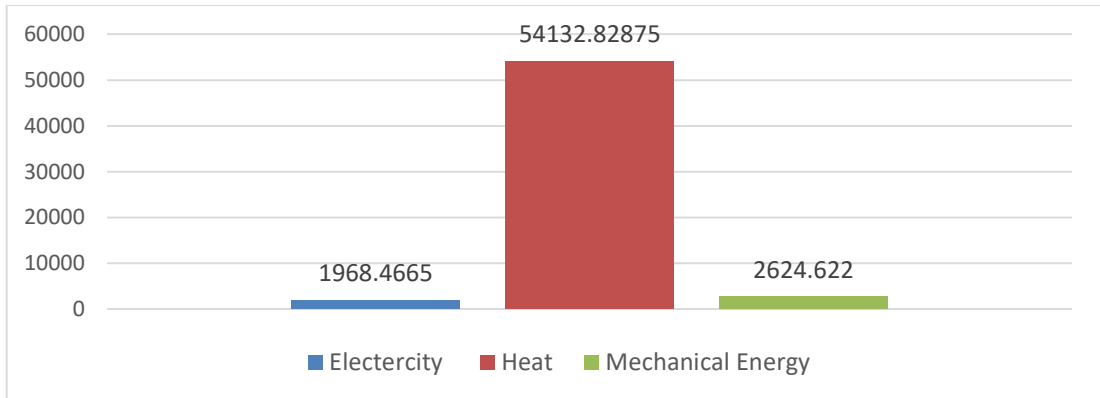
Bagasse Produced by Pakistan Sugar Industries for year 2018



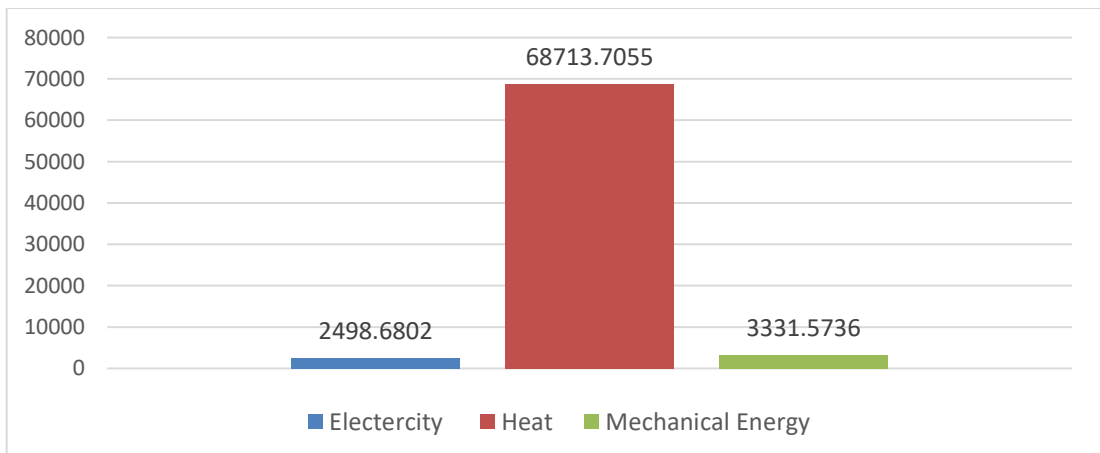
Brazilian Energy Production Model (KWh) from one tone of Bagasse



Energy production capacity (MW) per Day (4-month Season) from Bagasse as cane crushed in last season using the Brazilian Model

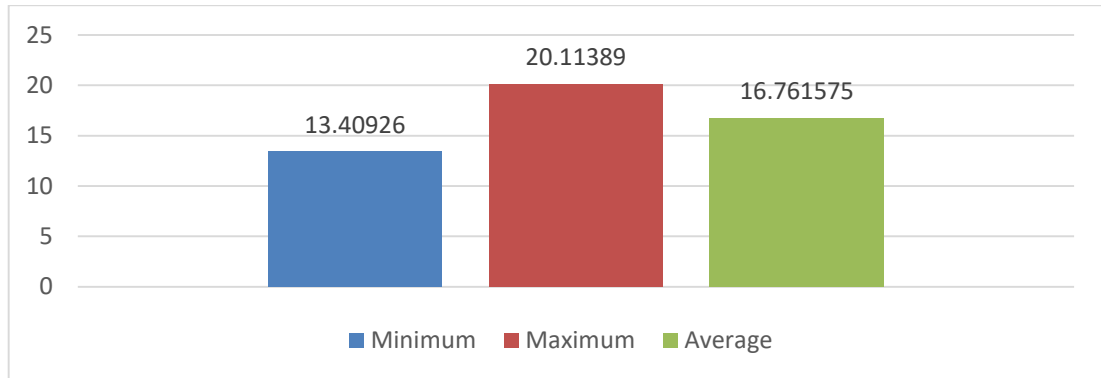


Energy Production Capacity (MW) per Day (4-month Season) at 100% Cane Crushing from Bagasse



Cane Trash in million tons for year 2018-19

- ▶ 10-15 tons per Hectare
- ▶ 1 Kg Produces 1kWh/kg
- ▶ Cane cropped in Pakistan 1.34 Million Hectares for Year 2018-19



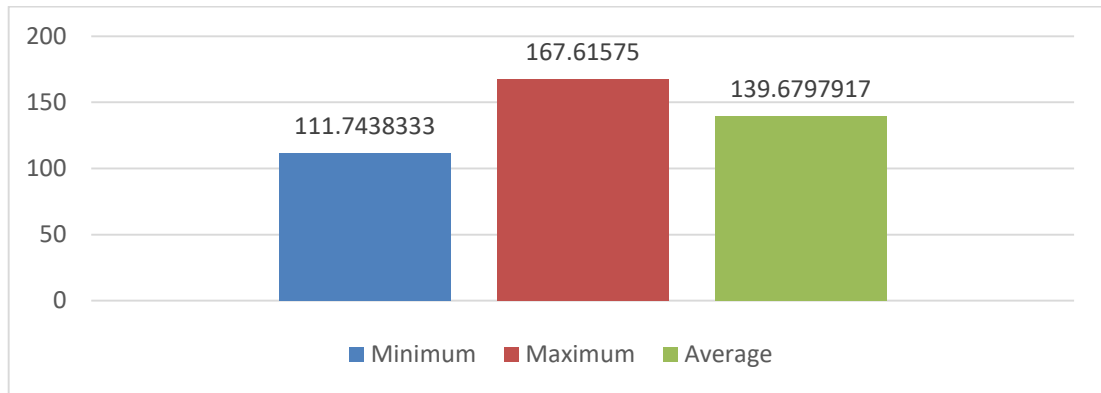
Cane Trash



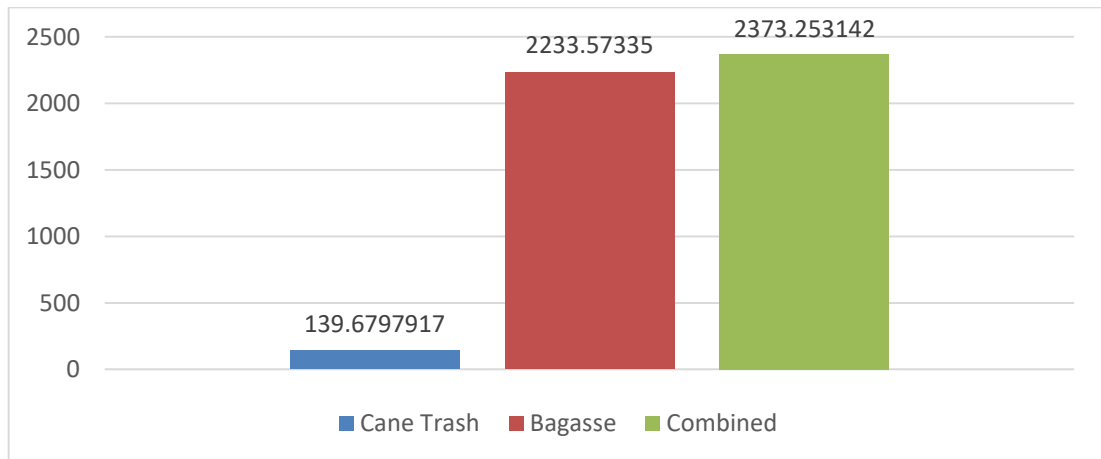
Smog formation



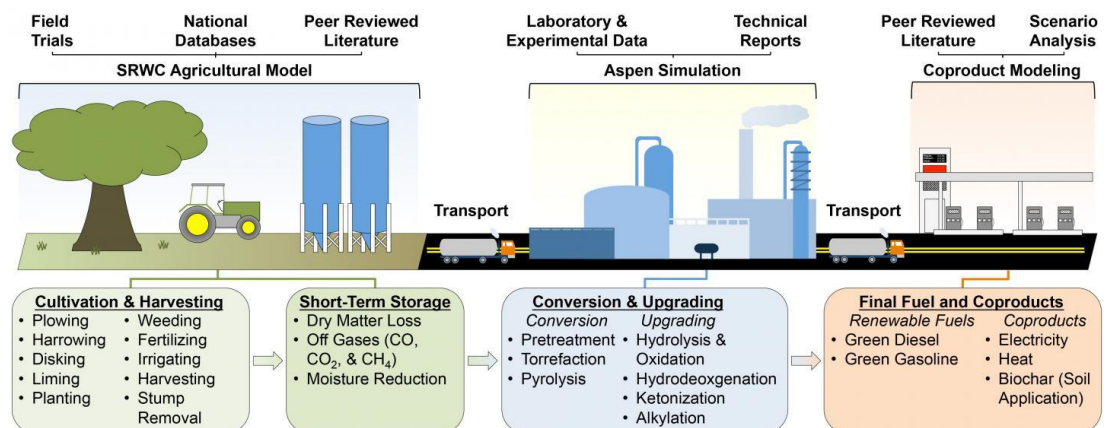
Energy Production Capacity (MW) per Day (4-month Season from Cane Trash)



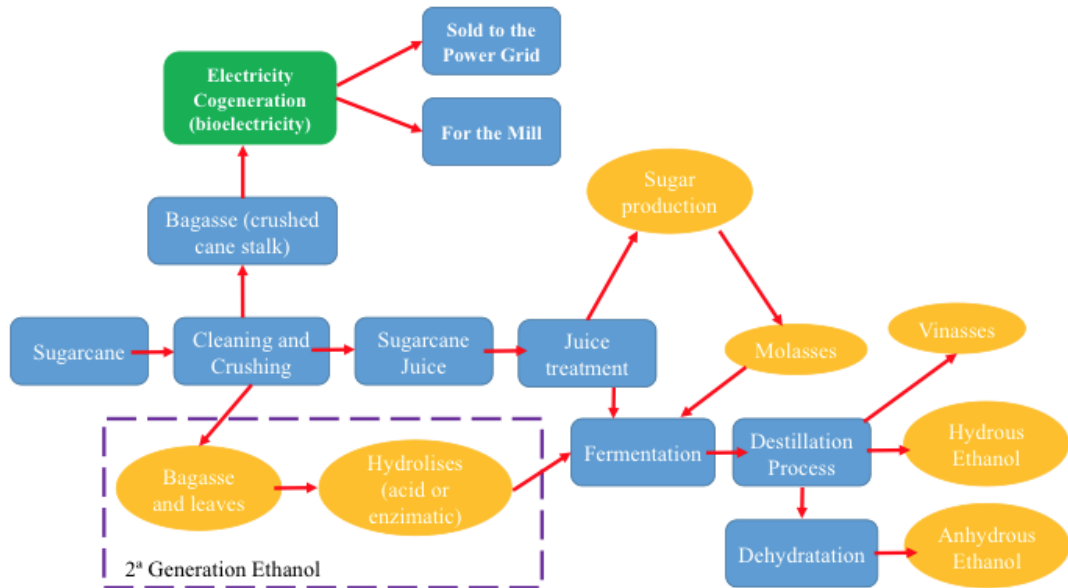
Combined Energy (Electricity) Production Capacity (MW) per Day (4-month Season from Bagasse and Cane Trash)



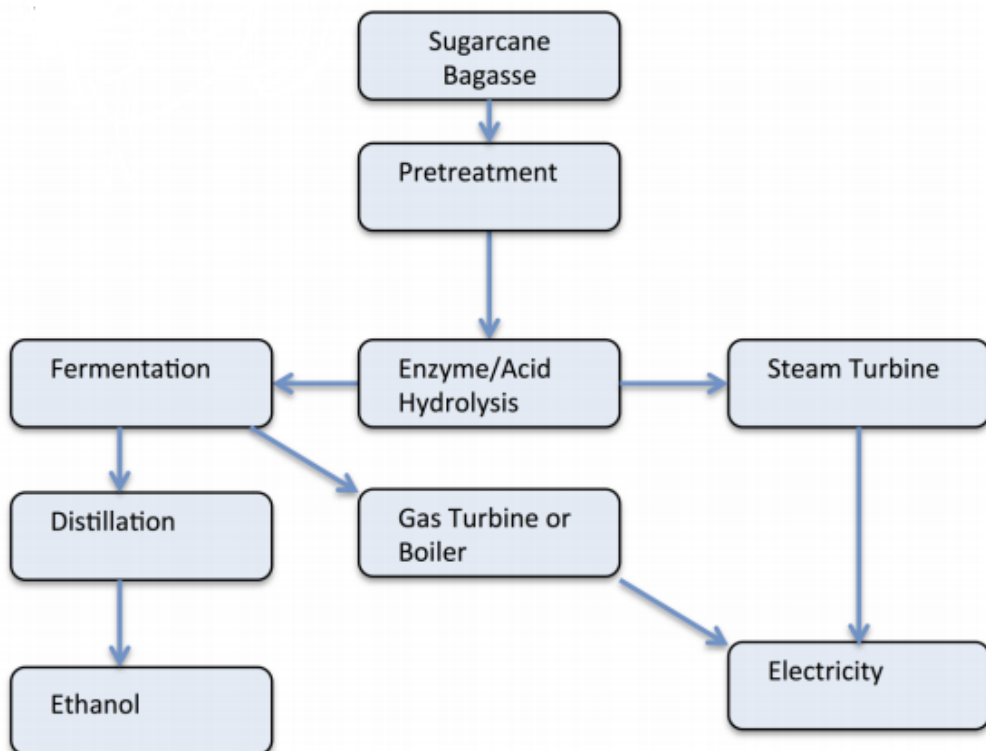
2nd Generation Biofuels



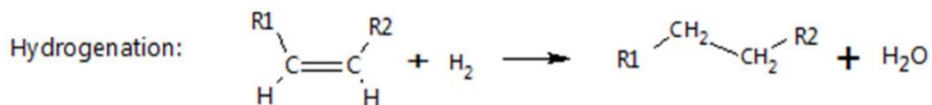
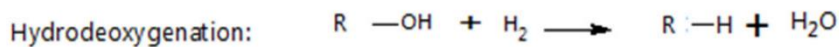
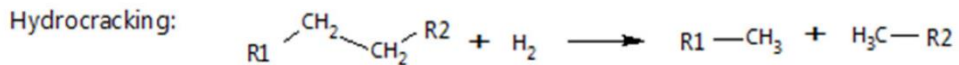
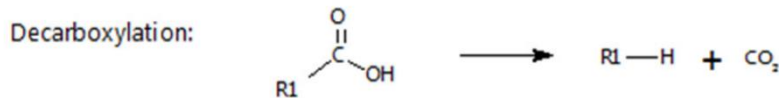
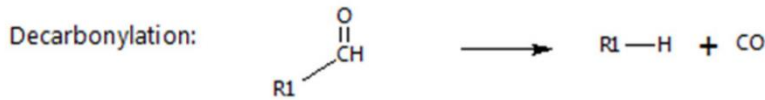
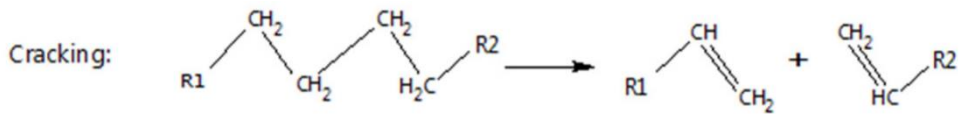
2nd Generation ethanol from sugarcane bagasse



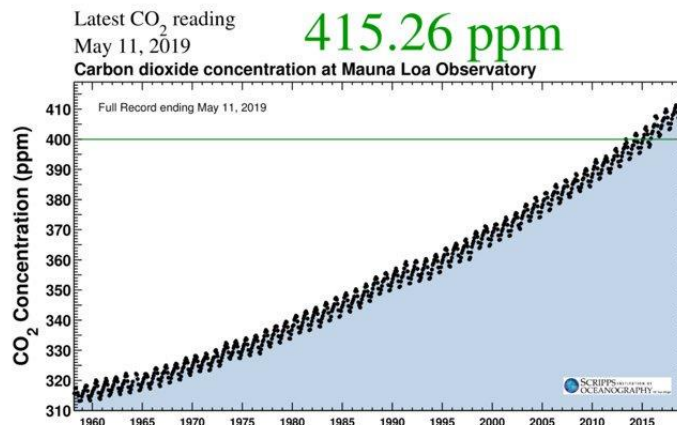
Biological process



Upgrading Processes



Recent Atmospheric Trends CO₂

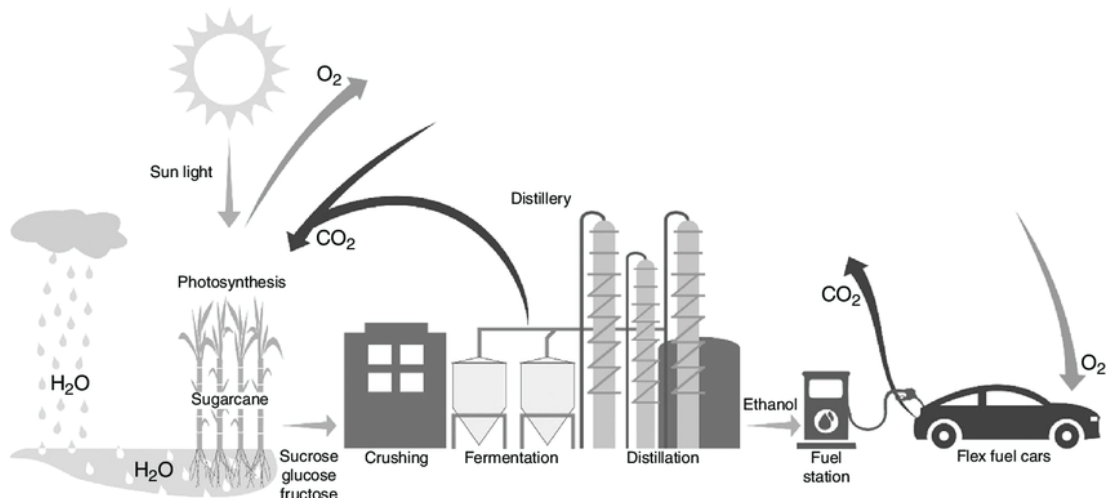


Climate change (Induced by CO₂) facts:

- Between 1998 and 2017 climate-related and geophysical disasters killed 1.3 million people.
- 4.4 million people were injured, displaced or in need of emergency assistance.
- World faced direct losses of \$2,908 billion (These figures are based on economic data of only 37 per cent of the events in CRED's Emergency Events Database)

- The World Bank has reported losses of \$520 billion annually, pushing 26 million people into poverty every year.
- The year 2017 was one of the worst in terms of economic losses, which were 41 per cent more than the average of the previous decade.
- In the same year (2017), a total of 335 natural disasters took place affecting over 95.6 million people, killing 9,697 and costing a total of \$335 billion.
- The death toll for year 2018 was higher than that of 2017.
- It took 10,733 lives affecting 60 million people globally. The highest death count of 4,535 was for Indonesia, followed by India which lost 1,388 lives.
- Pakistan which lost 240 lives stood 8th in 2018.

Production and Utilization of sugarcane its waste Reduces CO2 Emissions



Why should Pakistan Care?

- Pakistan is signatory of Paris Agreement.
- The Intergovernmental Panel on Climate Change suggests that a constant concentration of carbon dioxide alone at 550 ppm would lead to an average increase in earth's temperature of about 3 degrees Centigrade
- To stay below 1.5 degrees Centigrade to conform Paris Agreement the concentration should not exceed 478 ppm.
- Pakistan is in process of installation of Coal-fired power plants of capacity of around 15000 MW.

- ▶ Pakistan has received several funds from UNITED NATIONS FRAMEWORK ON CLIMATE CHANGE (under UNDP) to fight against climate change
- ▶ This is where sugar industries can help in negative emissions

More details on climate change and vulnerability of Pakistan

<https://dailytimes.com.pk/writer/dr-shaukat-ali-mazari/>



How hot summers make us vulnerable

ON MAY 24, 2019



Global warming has resulted in severe heat waves around the world. Recently, Pakistan, too, has been a victim of the phenomenon. Heat waves cause heat strokes which are often a serious health hazard and sometimes fatal. According to the World Meteorological Organization, "a heat wave occurs when the daily maximum temperature exceeds the average maximum temperature by 5 degrees centigrade for ... [Read more...]

The science of climate change

ON APRIL 29, 2019



The term global warming has long been used for long-term changes in worldwide weather patterns. It is still used interchangeably for climate change. The most trusted and well accepted data in this regard comes from the Inter-governmental Panel on Climate Change, established by World Meteorological Organization and the United Nations Environment Programme. Most of the environmental scientists ... [Read more...]

Evidence of climate change

ON APRIL 22, 2019

Materials for numerous applications at nano-scale

- ▶ Transparent barrier films
- ▶ Photonic crystals
- ▶ Shape-memory polymers
- ▶ Drug carriers
- ▶ Composite materials
- ▶ Optical and electronic devices
- ▶ Super capacitor electrodes

Encouraging Facts and Practices

- Mauritius has been a world pioneer in establishing sales of bagasse-based energy to the public grid
- By 2031 the whole sugarcane trash generated during harvesting in Brazil could be available for recovery and subsequently used.
- Cogeneration of bagasse is one of the most attractive and successful energy projects that have already been demonstrated in many sugarcane producing countries such as Mauritius, Reunion Island, India and Brazil
- World Alliance for Decentralized Energy (WADE) report says, “bagasse-based cogeneration could deliver up to 25% of current power demand requirements in the world’s main cane producing countries”