



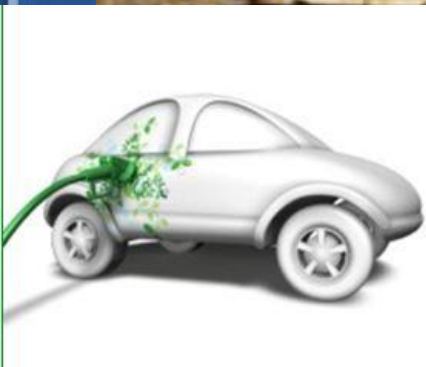
Environmental and Economical value of Biofuel

By

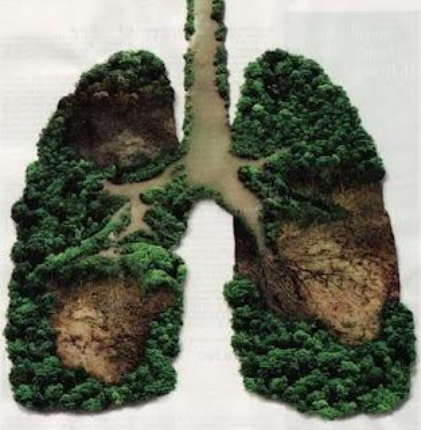
Dr. Essam Abdel-Mawla

Dean of Aquaculture Research Center
Arab Academy For Science, Technology and
Maritime Transport

Biodiesel







2/3 of forest had been removed



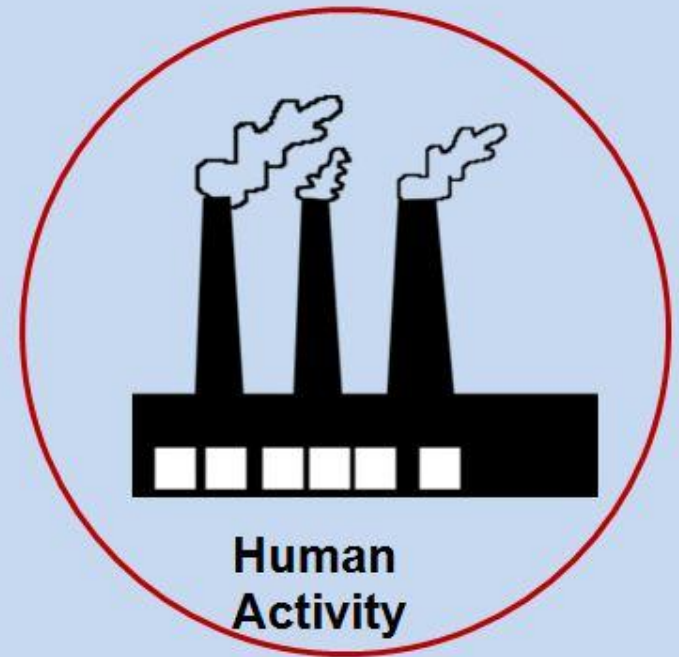
Things that can cause the climate to change are...



Natural Variations

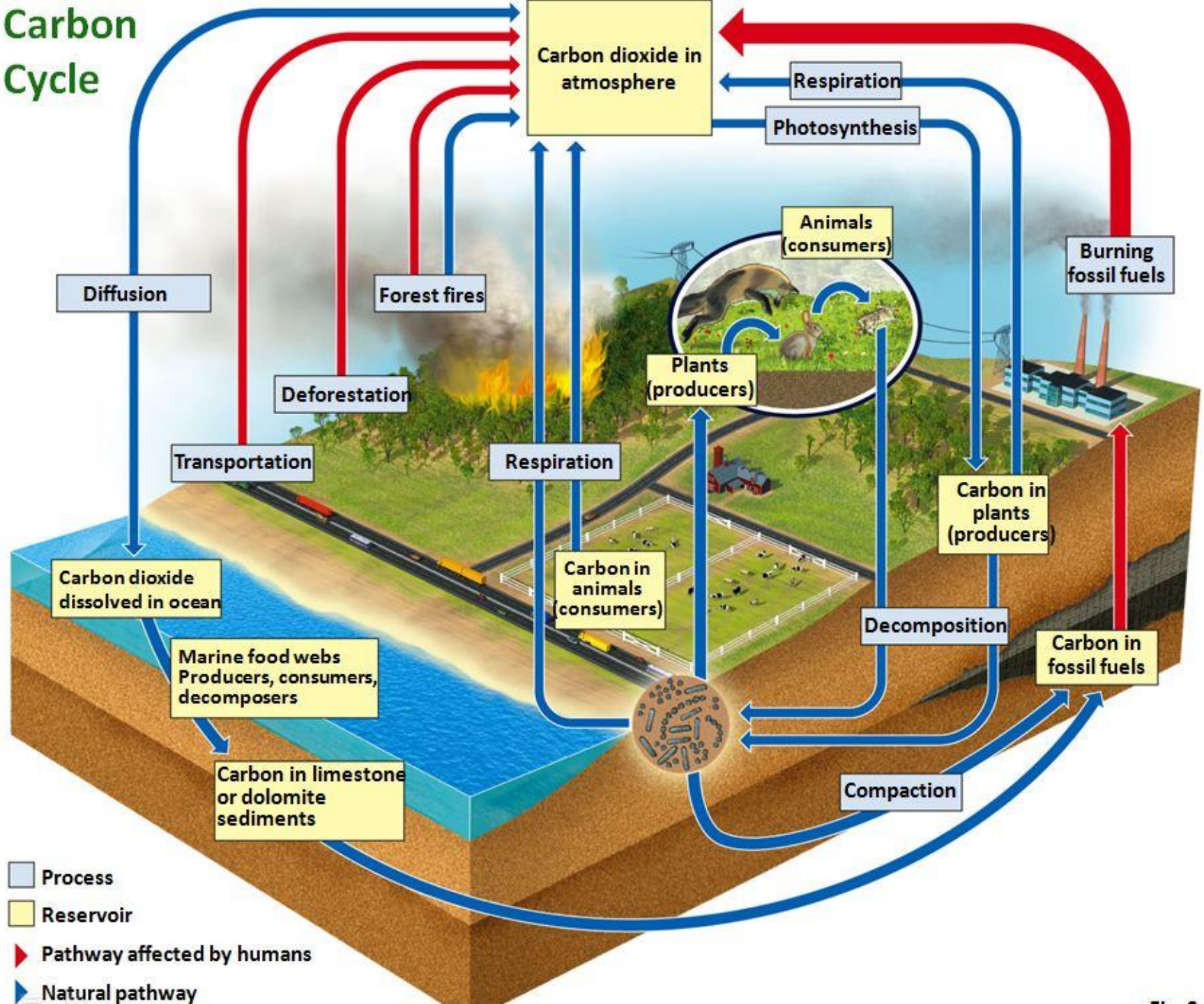


Volcanic Eruptions



**Human
Activity**

Carbon Cycle



Greenhouse gases are increasing!

CO₂ to Atmosphere

Human Activity

- Combustion:
Burning of coal and fossil fuels
- Deforestation

Methane to Atmosphere

Human Activity

- Landfills
- Agriculture
- Livestock

Other gases to atmosphere

Human Activity

- Ozone from car exhausts
- CFC's from aerosols

Deforestation



Stopping
Human
Activities

Destroying our
planet




Using
renewable
energy

**Saving our
planet**



renewable
energy





A **biofuel** is defined as any fuel whose energy is obtained through a process of biological carbon fixation.

Biological Carbon fixation is a process that takes inorganic carbon (in the form of things like CO₂) and converts it into organic compounds.

78% lower carbon dioxide

35% lower carbon monoxide

32% lower particulate matter

83.6% lower overall bus exhaust-pipe emissions

8% lower sulphur oxides

3% lower methane

96% lower of hazardous solid wastes



	Biodiesel	Petroleum Diesel
Cetane Number	51 - 62	44 - 49
Lubricity	High	Low
Biodegradability	High	Low
Toxicity	non-toxic	Highly toxic
Oxygen	Up to 11% Free Oxygen	Very low
Aromatics	No aromatic compounds	18-22%
Flash Point	130 Deg. C	64 Deg. C
Shipping	non-hazardous non-flammable	Hazardous

World Biodiesel Production 1991 - 2005

(Millions of Litres)

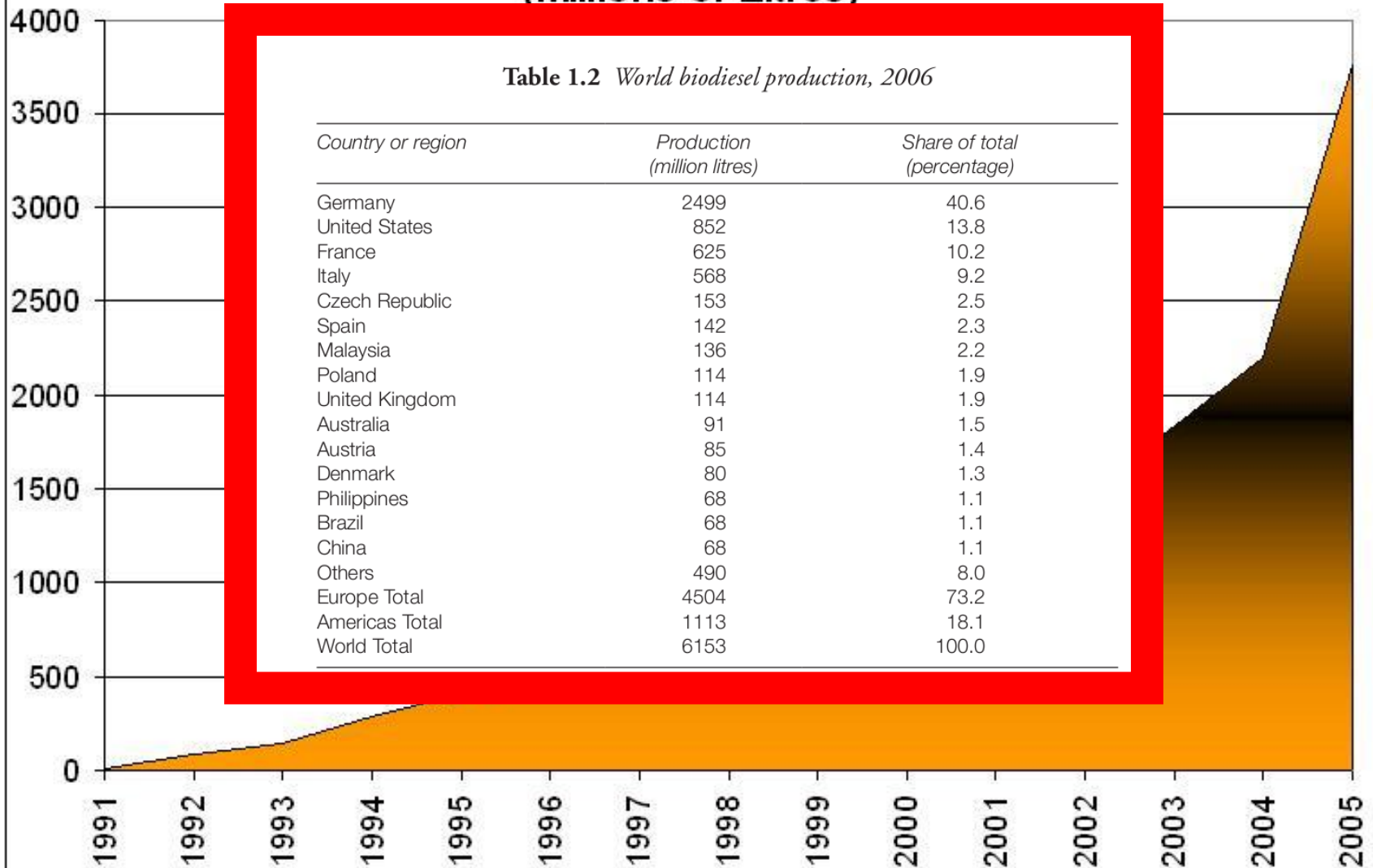
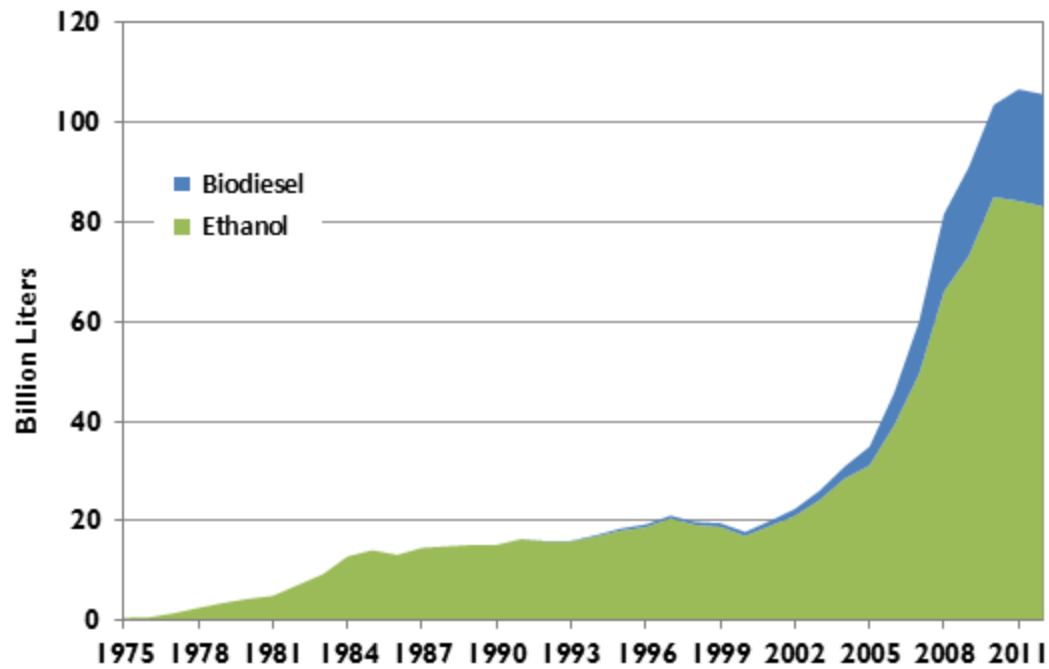


Figure 1. | World Ethanol and Biodiesel Production, 1975–2012



© Worldwatch Institute

Source: F.O. Licht, RENZI

Biodiesel Production sources

Algae

Vegetable Oil

Halophytes (marine plants)

Waste Used cooking Oil
(WUCO)



Bag Culture



Tubular Reactor

Gallons of Oil per Acre per Year

Corn	18
Soybeans	48
Safflower	83
Sunflower	102
Rapeseed	127
Oil Palm	635
Micro Algae	5000-15000

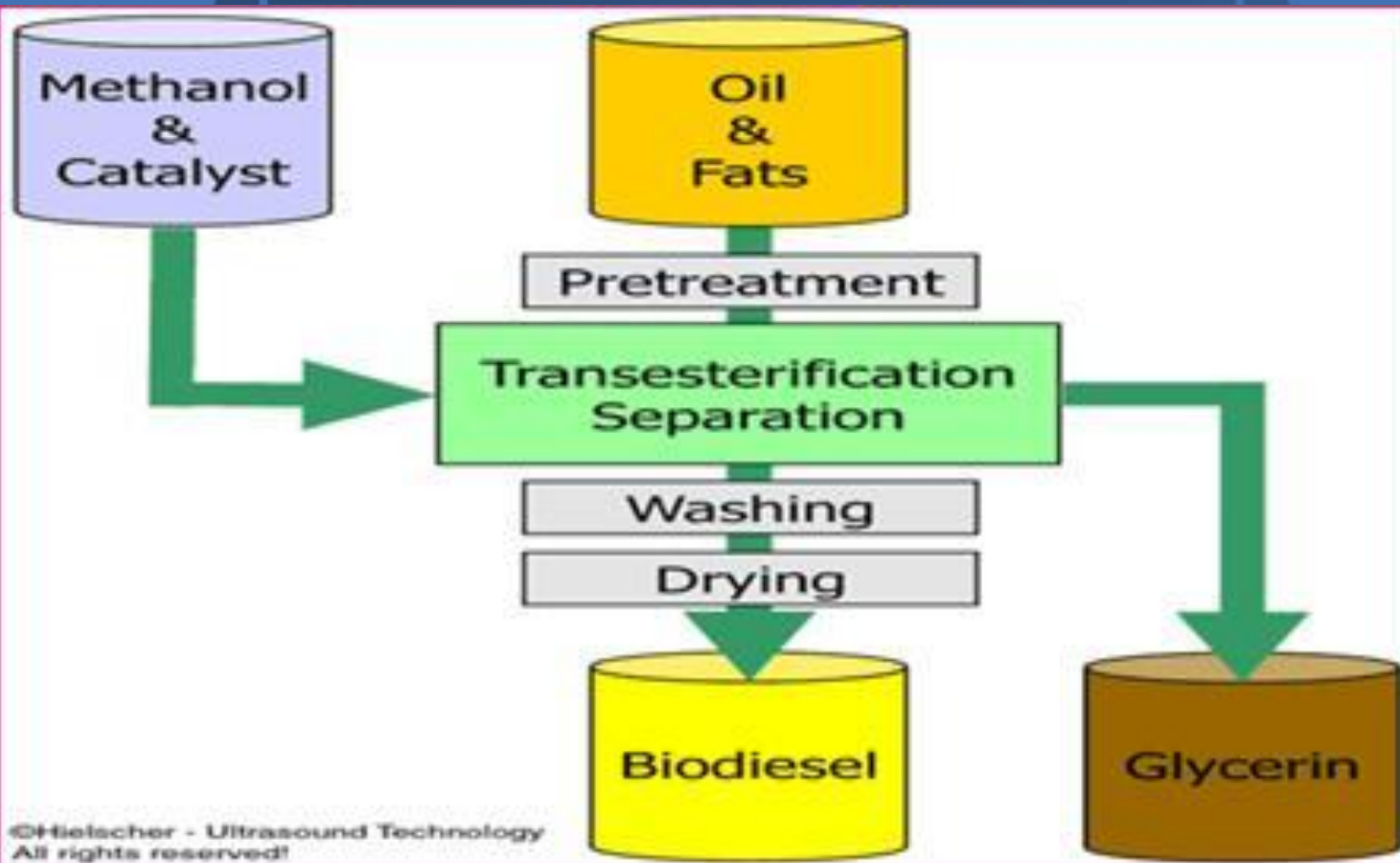
Algae-Based
Biodiesel



Crop-Based
Biodiesel



Representative Yields: Gallons/Acre

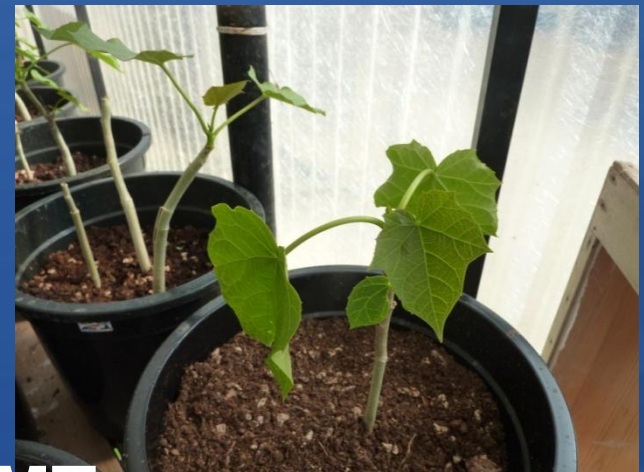




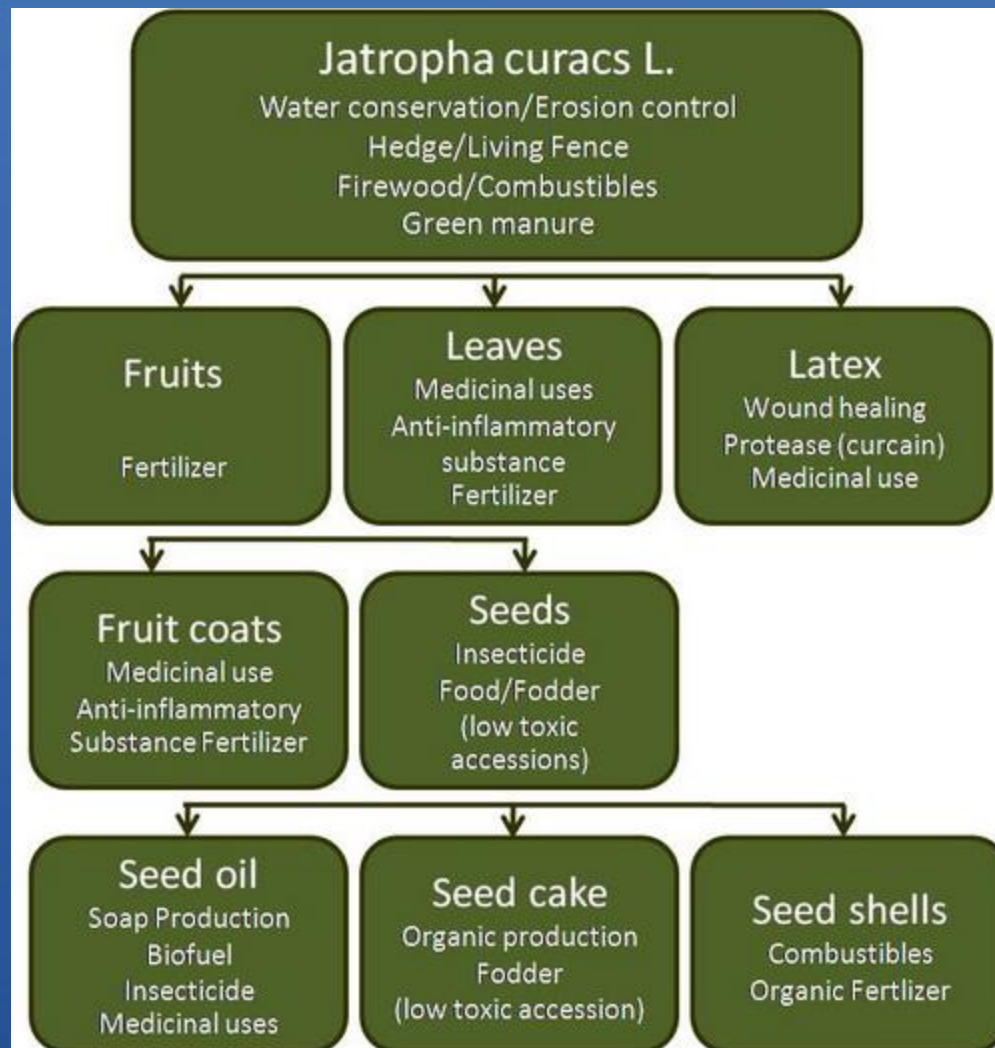
Jatropha curcas







Jatropha experiment in AASTMT



Evolve your biodiesel processing with Evolution Biodiesel!



Mega Ester Biodiesel Processor

A full *processor kit* with a 40 gallon production, heating system, oil filtering barrel...

New SALE Price \$2800

Regular \$3495
See full specs...



Mega Ester II Biodiesel Processor

A full *processor kit* with a 80 gallon production in 8-14 hours, built-in 220 V heater, 4500 watts, 45-80 minute heat time...

New SALE Price \$4100

Regular \$4995
See full specs...



Evo Kleen™ 1000 Dry Wash

New, upgrades any biodiesel system, user friendly, polishes finished biodiesel...

ON SALE \$3900



Farm Boss Biodiesel Processor

230 gallons of biodiesel batch *production* in 8 to 14 hours, great for businesses...

New SALE Price \$6600



**Egyptians consume more
than million tons of
edible oil per year**







Carbon sequestration



Leaf diamter (30-50 cm)
10 kg seed/tree/year









***Samia ricini* (Castor silkworm)**



Composting

Economic value:

1 Agriculture

2- dozen diverse industries

- ▣ **Relatively high crop yield**
- ▣ **Less competition with food crops.**
- ▣ **Produced biodiesel reduce greenhouse gases emissions by 90%**
- ▣ **Stimulate rural development,**
- ▣ **Create jobs,**
- ▣ **Save foreign exchange**
- ▣ **Carbon sequestration (25-50 Tone of CO₂/acre)**



**Together we can save our
planet**