Biofuels: growing renewables and restoring degraded land?

Global human population

is estimated to be about **9.2 BILLION** by 2040. [1]

Consequently, energy consumption will also substantially **increase...**

>750 QUADRILLION BTU by **2040s**

with **77%** fulfilled by **fossil fuel** and **bioenergy** projected to contribute a quarter and a third of future global energy mix. [2,3]

7 AFFORDABLE AND CLEAN ENERGY

The International community has identified a need for clean and renewable energy through the SDGs number 7.

Renewable energy

is **essential** element to reach **Paris Climate Agreement**

...and several countries have their renewable energy targets such as Indonesia targeted to have 23 percent of its total energy use comes from the renewable energy by 2025.

23%

Global CO_2 emission

also predicted increase more than **40,000 million metric tons** (MMmt) by 2040. [3]

Fossil fuel has contributed emitting over

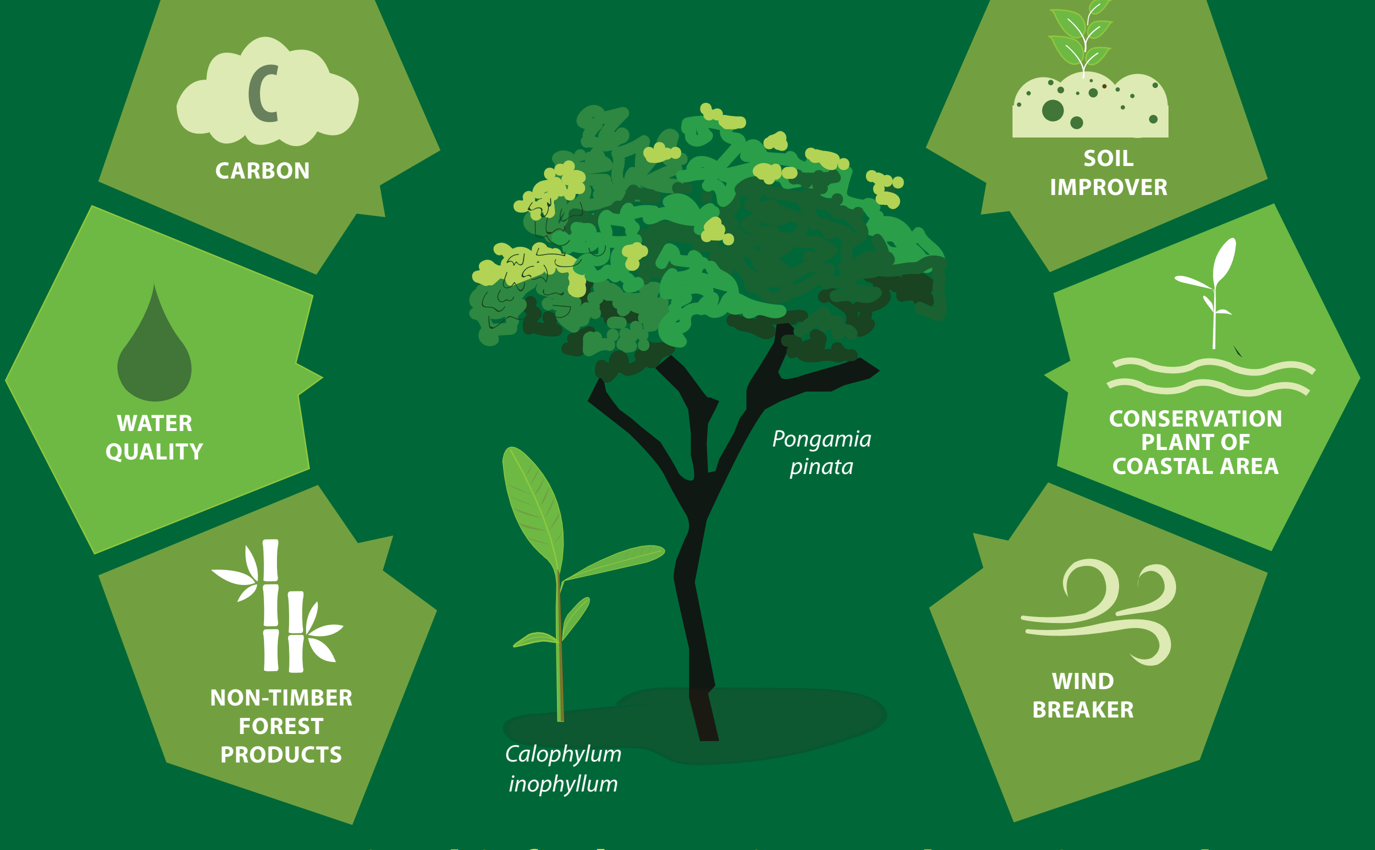
400 BILLION Mt CO_2

between 1751 ⟷ 2014 [4]

alternatives with advantages

Biofuel producing tree plantation such as *calophyllum inophyllum (nyamplung)*, *pongamia pinnata* have higher benefit in maintaining biodiversity and other ecosystem services...

[5-9]



Encouraging biofuel cropping on the estimated 1–6 billion ha already degraded lands around the world...

- avoids new deforestation due to increased demand for lands for biofuel crop
- helps to restore the degraded lands
- increases income for developing nations

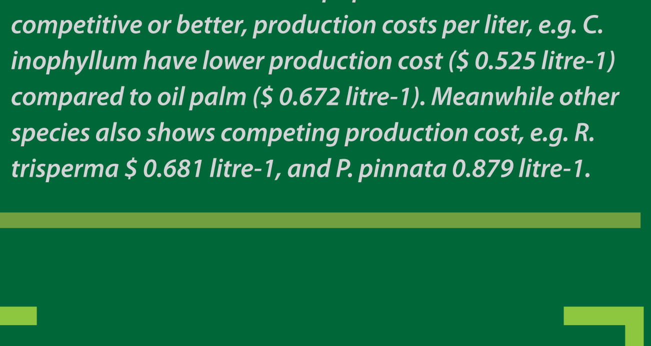
One study of degraded land biofuel potential in Indonesia indicates that the country may be able to produce the equivalent 157% of its 2015 diesel consumption on degraded lands – with no compromise of food production, large carbon stocks, biodiversity, or native vegetation.

OIL YIELD OF EACH SPECIES

[10-19]

Comparison between potential bioenergy crops shows that while oil palm has the highest potential producing bioenergy by 5,950 litres ha-1, other species also have competitive oil yields in addition to higher environmental value.

BIODIESEL PRODUCTION COST



[13, 20-21]

Some alternative biofuel crop species also have competitive or better, production costs per liter, e.g. C. inophyllum have lower production cost ($ 0.525 litre-1) compared to oil palm ($ 0.672 litre-1). Meanwhile other species also shows competing production cost, e.g. R. trisperma $ 0.681 litre-1, and P. pinnata 0.879 litre-1.

FRUIT YIELD OF EACH SPECIES

[7,10, 16, 18, 22]

Other species might also provide different potential energy, P. pinnata can be used to produce bio-aviation fuel

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National Institute of Forest Science

This study was supported by the National Institute of Forest Science (NIFOS) and the Republic of Korea under the Economic and Environmental Benefits of Bioenergy Production in Degraded Land in Indonesia project.

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