

Biomass to Biochar for Farm Bioeconomy



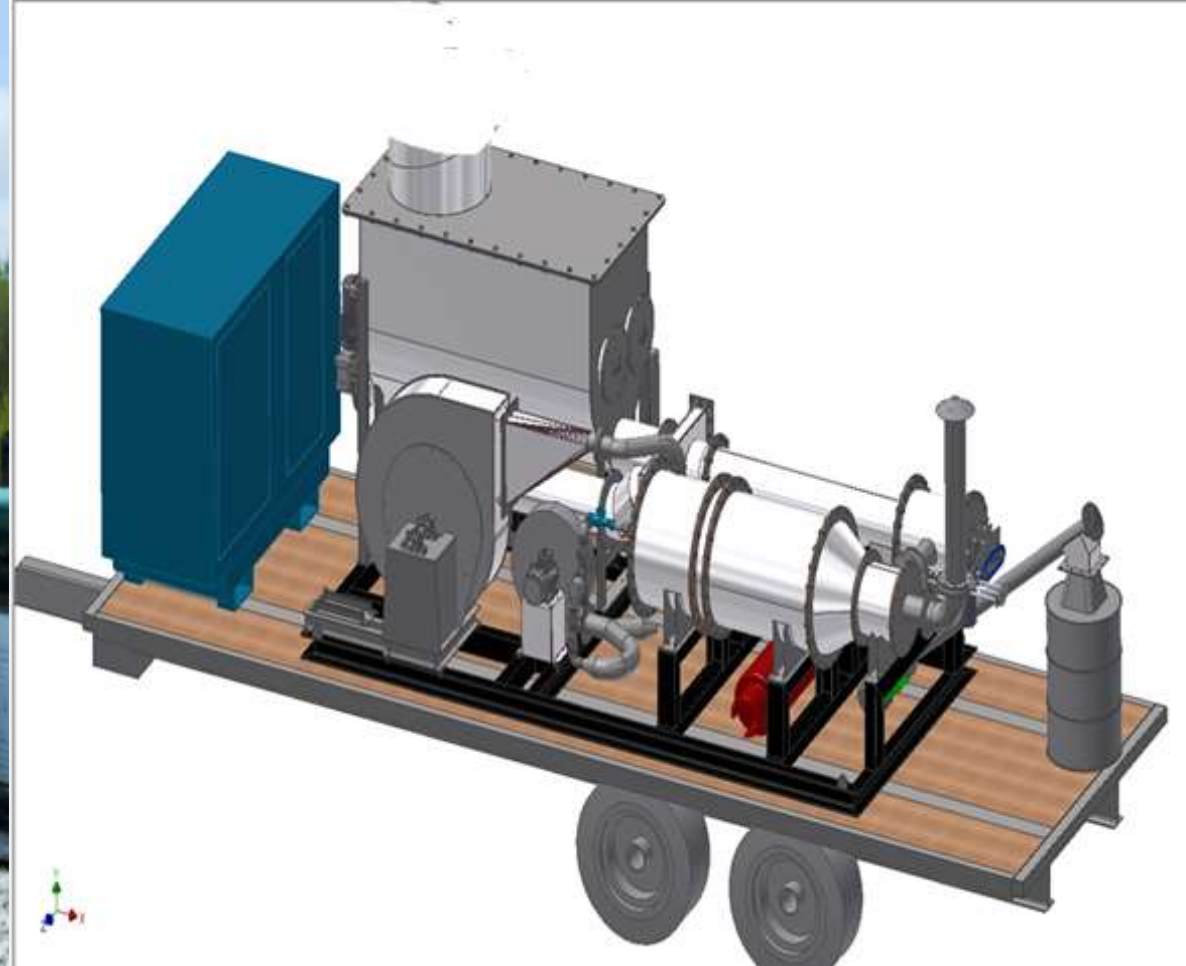
WHAT WAS THE BIOECONOMY ??

FORWARD TO THE PAST

- The bioeconomy means using renewable biological resources from land and sea, like crops, forests, fish, animals and micro-organisms to produce food, materials and energy.
- Using local resources to sustain local communities. In the past 60 +years ago, energy was produced locally as was primary food needs e.g. Milk, Meat Vegetable & Grain. The local economy was circular, the horse helped with crop cultivation and was fed by the crops they help cultivate, the shed they were housed in were built from local material (stone, wood and at one time straw roofs). The people lived in houses derived from local materials.



THE Mobile Pyrolysis unit (MPU)



WHY IS BIOCHAR SO IMPORTANT TODAY?

Biochar provides a **sustainable** and readily available solution for unutilised farm biomass and provides a **positive carbon contribution** to the environment. Also, carbon trading markets that sponsor carbon sequestration, could help **supplement the farmers' income** while increasing the sustainability of Ireland's agriculture sector.



- The significance of biochar is that it has the potential to provide farmers with the means of closing the nutrient loop by using it as an additive to bedding, feed & slurry. **This is a carbon farming solution**
- In Ireland's Climate Action Plan, there are over 20 of the key priority areas that would benefit from the use of biochar.
- There is no displacement of food production from the production of biochar made from unutilised biomass such as Rushes.



Silage additive



Feed additive



Bedding additive



Manure treatment



+plant substrates



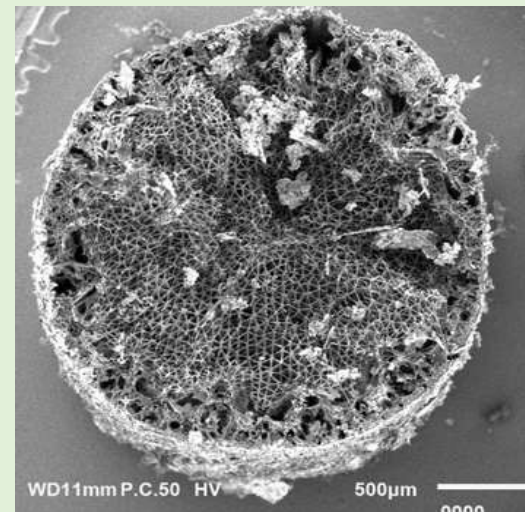
composting



Soil improvement + fertilization

Integration into a Cascade of Application

Source: Ithaka-Institute



WD11mm P.C.50 HV 500µm 0000

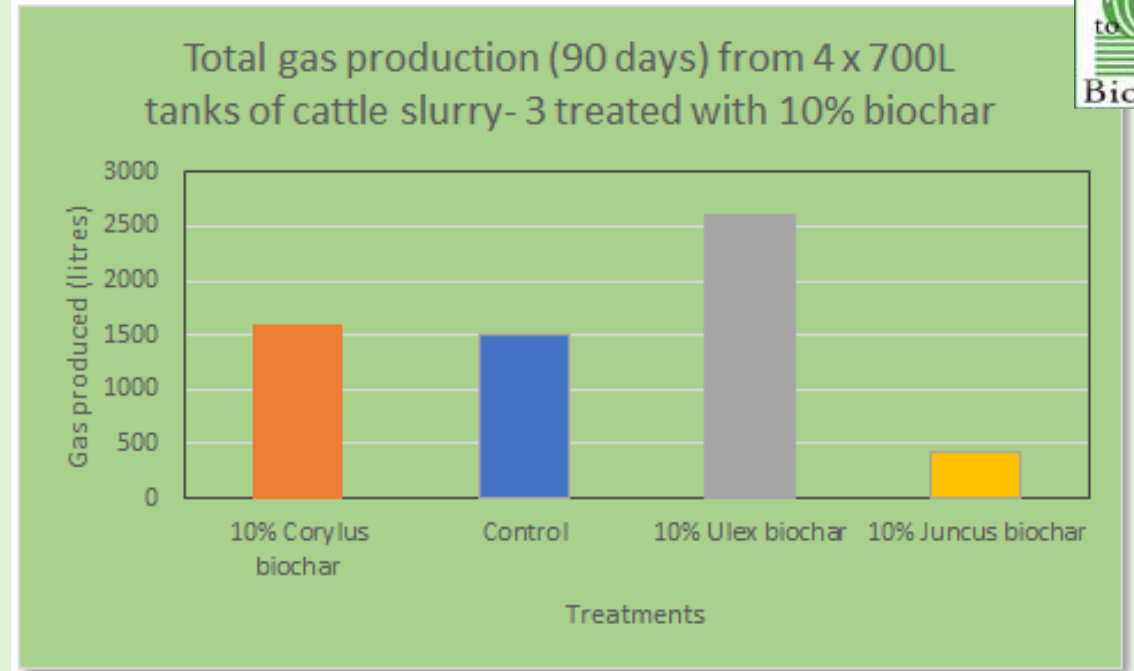


In Situ Study

- 4 tanks x 700 L cattle slurry
- 1 control & 3 with 10% biochar (furze, hazel & rush).
- Gas vol measured over 2 months.
- Hazel no effect
- Furze biochar 25% more gas than control
- Rush biochar 60% less slurry gas than control

Lab Repeat Study of Rush Biochar added to Slurry

- Reduced Methane by 33%



ADDED
TO SILAGE 

Improves feed efficiency

Reduces greenhouse
gas emissions

Adsorbs toxins & pathogenic enzymes
in the rumen and gut of cattle

Improves livestock
housing environment



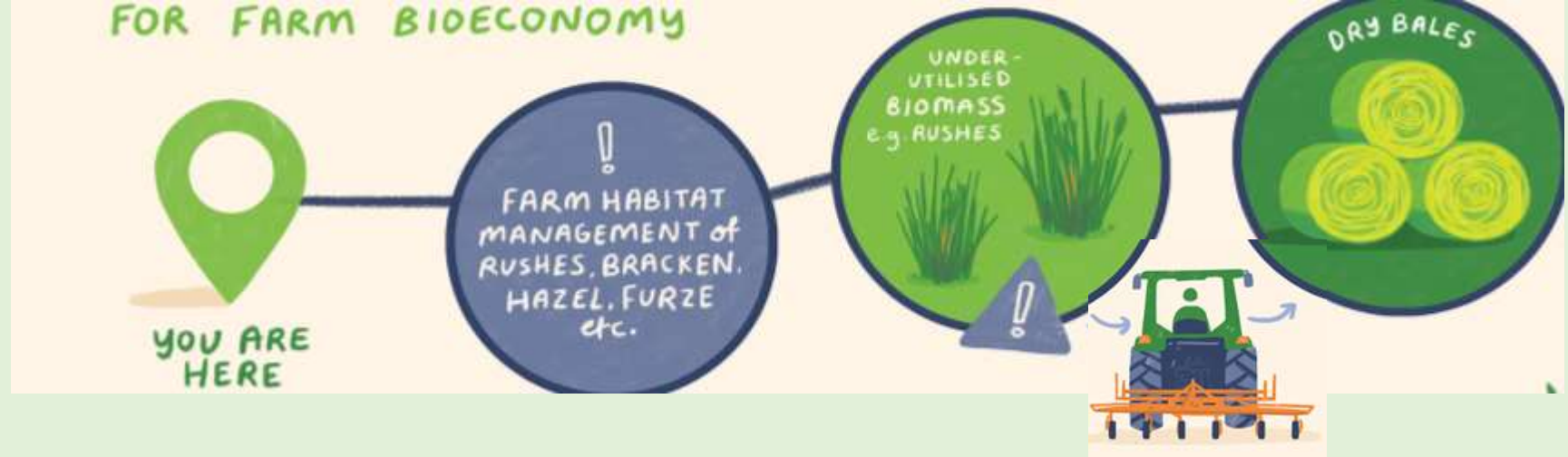
Rumen Trials with Rush Biochar, UCD

A study into the effects of varying inclusion rates of biochar as a feed additive is required. Information is sought on how a high-forage diet on bovine ruminal fermentation, nutrient digestion, and enteric methane production are affected by a novel feed additive such as biochar. The aim will be to investigate with an in vitro system

- (a) the impact of the biochar addition, as well as
- (b) the response to inclusion rate.



The Irish Farmers Survey



- 125 farms over 21 counties
- 46% had at least 2-5 hectares of rushes
- At other end of scale 4% had more than 35 hectares of rushes
- Presently 64% of rushes surveyed are not being harvested (rest are sprayed, topped, mulched or used for bedding)
- Of the 24% that are harvested & baled, 45% are stored in sheds

Range	Respondents	Median	Heating oil equivalent *	Biochar yield
Ha	%	Bale yield	Litres	Tons
1- 5 ha	49.6	35	3,439	1.75
6-10 ha	21.5	57	5,600	2.85
11-15ha	10.7	91	8,941	4.55

* <https://www.teagasc.ie/rural-economy/rural-development/diversification/straw-for-energy/>

FOR WATER
PURIFICATION



Decontamination - helps to adsorb pesticides and fertiliser run-off in water and removes biological & chemical contaminants.



Study Using Rushes Biochar as Filter Medium

- well water, pond water, grey water
- study looks at whole Irish Farm scenario
- completion in around 2 months time



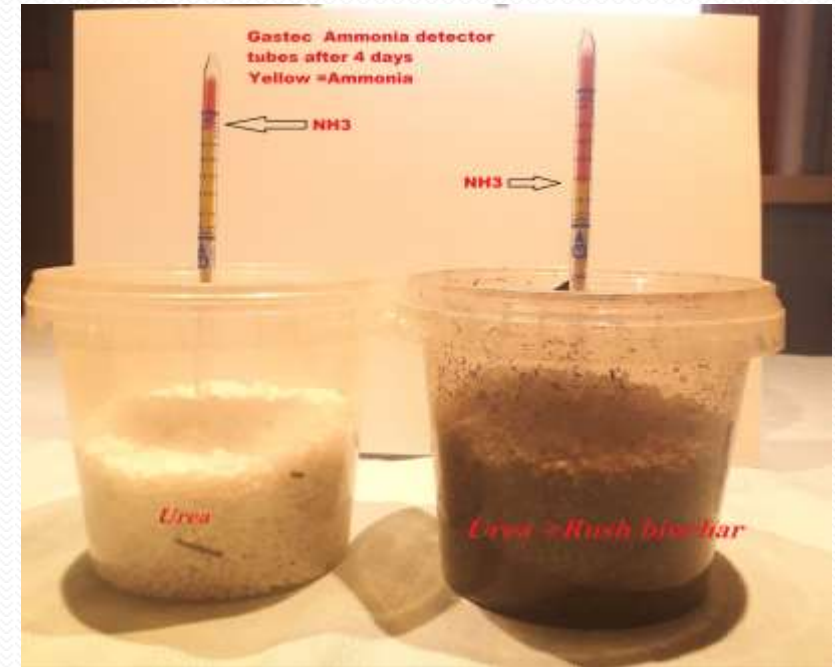
Products from rushes



**PEAT FREE
POTTING MEDIA
MADE FROM
100% RUSH
(Juncus)**

Urea coated with biochar-

Student from local school carrying out further work as part of Young Scientist Exhibition



**Call for Expert Evidence
Climate Action Plan 2023**
CCS v CDR

Opportunities



Increasing awareness on the impact of Herbicide use. e.g. MCPA on water quality. Thus alternative to use of chemical control sought.

A sudden awareness that its not prudent outsource our energy needs. Biogas was little spoken about 6 months ago. Could Pyrolysis and Gasification be the same in the near future?

Biochar now recognised as an EU Fertiliser July 2022

https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12136-Fertilising-products-pyrolysis-and-gasification-materials_en.

Land rewetting

June 2022 Commission adopts proposal for a Nature Restoration Law legal binding rewetting targets possibly 300,000ha of currently farmed Irish peat soils will be rewetted allows for the 'cultivation of various types of reeds and certain forms of timber '.

Ban of green waste burning Hedges will still be cut what is to happen to this material?

<https://www.agriland.ie/farming-news/minister-of-state-rules-out-further-exemption-on-burning-green-waste/>

BRUSSELS, Nov 11 2022 (Reuters) - The European Union has agreed to a law to expand its forests, marshes and other "sinks" that absorb carbon dioxide (CO₂), a measure that could allow the bloc to raise its target for cutting net emissions of greenhouse gases. I.e. CDR

Could we have results based payment scheme that might be part of a bigger Agric scheme such a ACRES where biomass from managed grasslands could be harvested and converted into biochar a payment made for every ton of biochar produced all done within the European Biochar Certificate rules??

WE'RE GONNA NEED

A BIGGER MACHINE