

**The statement below provides the overarching framing for the submission  
by the Irish Biochar Cooperative Ltd to the Bioeconomy Action Plan.**

**27.1.2023**

*“Global land use history confirms that empowering the environmental stewardship of Indigenous peoples and local communities will be critical to conserving biodiversity across the planet.”*

### Pillars of the Bioeconomy

Question 1: Are you satisfied the outlined Pillars represent the structure of the Irish bioeconomy?

We note that ‘Governance’ is given an overarching role while the other 7 pillars are equal and independent but subject to ‘Governance’. ‘Governance’ suggests a centralised authority comprising representatives of national public and semi-state bodies. In that case, it opposes our framing of placing the local resident community at the heart of the bioeconomy of their bioregion. As all politics is local, so to the bioeconomy. Governance of flourishing circular bioeconomies (note plural) requires that they correspond to, and be rooted in natural bioregions: in Ireland’s case, river basin districts and maritime coastal regions.

Secondly, ‘Community’ i.e. the people living in a bioregion must play a major role in governance. A recent meta analysis of planetary biodiversity hotspots discovered that they overwhelmingly coincide with recent or current indigenous human habitation.

*‘With rare exceptions, current biodiversity losses are caused not by human conversion or degradation of untouched ecosystems, but rather by the appropriation, colonization, and intensification of use in lands inhabited and used by prior societies<sup>1</sup>.’*

It follows then that local communities within the bioregion, acting as the feedback intelligence of their ecosystems, are best placed to coordinate the activities of the other non-localised 6 pillars of ‘Research, Development & Innovation’ ‘Nature, Climate & Circular’. ‘Agriculture, Forestry & the Marine’, Knowledge & Skills Pillar.

The Bioregions could also liaise with the relevant government departments to provide feedback from the bioeconomy regions to spark policy change and guidance to national, regional and local authorities and agencies to eliminate blockages and share useful learning with the mainstream extractive economy.

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<sup>1</sup> **“People have shaped most of terrestrial nature for at least 12,000 years”**, Arizona State University, Tempe, AZ, April 19, 2021118 (17) e2023483118 <https://doi.org/10.1073/pnas.2023483118>

In effect the Bioregions will provide a 'bioeconomy proofing' similar to 'poverty proofing' checklist for the Department of Agriculture, food and the Marine, and the Department of the Environment, Climate and Communications, the Planning and Regulatory authorities at Local Authority and Bord Pleanála level.

The Bioregional Governance Agencies should be resourced to carry out the networking, awareness raising and sectoral and regulatory coherence role as already outlined. They will communicate with each other and guide sectoral interests with a voice that will be familiar and trustworthy.

This is in stark contrast to the current situation where centralized governance is seen as being captured by powerful stakeholders to the detriment of local communities, family farmers, foresters and small businesses. The recent Coillte proposal for constructs with private investors Gresham House and Nature Trust is enlightening in this regard. <sup>2</sup>

### Governance Pillar

**Question 2: Are there specific key performance indicators and/or targets the bioeconomy should be setting out to achieve to measure its implementation?**

Thriving bioeconomies require indicators that strongly align with ESG objectives that are meaningful and measurable. The most important are those on the ground in the bioregion– starting with land.

1. **Key Indicator: An Open, Searchable Land Cadastre.** The Land Registry is a good resource for this information but it is deliberately opaque and costly to use. Griffith's Valuation and the Ordinance Survey of Ireland once led the world in the technology of mapping and recording property wealth. Ireland can recover this leadership by mapping and recording our biodiversity and ecosystem wealth starting with an updated bioregional open database of ultimate interests in land.
  - **Target: Wider Irish Ownership of Interests in Land:** to reverse the consolidation of landownership in the few and the absentee and give a *real* stake to the denizens of Ireland. By interest in land, we include freehold, licenses and leaseholds of all types and durations and new forms of ownership appropriate to the current age i.e. Shares in Land Cooperatives and Beneficiaries of Land Trusts.
2. **Key Indicator: Water Quality:** Water quality is the UR indicator of the health of every ecosystems in the water catchment bioregion. The river water quality reflects the stewardship of bioregion community like no other. The community should wear it as badge of shame or honour.
  - **Target-** increased insect life followed by wild fish biodiversity, and quality. Restoring rivers to their full ecosystem potential mitigates flooding and creates high value recreational and health benefits.
3. **Key Indicator: Soil Carbon.** Soil carbon measurement is not easy but Teagasc has achieved technical milestones recently with research

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<sup>2</sup> DÁIL ÉIREANN, JOINT COMMITTEE ON AGRICULTURE, FOOD AND THE MARINE Minutes 13th December 2022.

revealing the vast differences in soil carbon sequestration/losses according to soil type and use. This reinforces our demand for Bioregional Governance. Irish labile soil carbon is the highest in Europe due to the shift from mixed farming to extensive cattle grazing post Famine; - you read right - cows can build soil carbon. Unfortunately we get no credit from EU GHG accounting for inherited C in our soil. Luckily, there does not appear to be an upper limit to the benefits of sequestering recalcitrant carbon (easily measured biochar) in soils. This is an area where Ireland can quickly make progress to partially offset the enteric emissions of pastured cattle.

- Target - Sequester C equal to 20%+ of the Co2 equivalent enteric Methane emissions of organic pastured beef per annum. The suckler beef sector is the unjustly singled out in terms of climate change impact. But in terms of the bioeconomy, it has the widest distribution of farm ownership and covers the most biodiverse areas of the country. Its carbon footprint is the easiest to reduce with biochar made from farm and forest waste fed to cattle and/or added to slurry and incorporated in the soil.
  - Target - Increase biochar amended cattle slurry by 20%. Simply adding biochar to slurry before spreading reduces a potent GHG, Nox by 70% according to a Teagasc study and NUI<sup>3</sup>. It also makes the P in the slurry more bioavailable to soil microbes enhancing grass growth. Biochar is easily weighed and converted to Co2 equivalent. Farmers can list the fields on agfood.ie in which biochar is incorporated to generate CO2 Removal Certificates <sup>4</sup>, these are aggregated to sell in the international voluntary carbon market. An easy win here will establish the credentials of the bioeconomy approach nationally.
4. Key Indicator: Increased biogas production from farm waste especially cattle slurry. Barriers to viable small-scale anaerobic digesters (ADs) that provide a service to local farmers should be removed so that this sector can grow quickly. Adding biochar to the slurry at the appropriate time in the digestion process increases methane by 20%. The resulting digestate has better soil conditioning qualities too. Use as an AD additive is the largest market for biochar in the UK.
- Target: 20% increase in biogas (methane) from farm waste by supporting distributed AD projects and working with farmers to record fields where the biochar-amended slurry is spread for C credits as above.

### Question 3: What other key issues should the Governance Pillar deal with?

The circular economy aspects of the bioregion require another set of indicators and targets that are situated in mixed bio/extractive economy but cover services and uses vital for full community life.

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<sup>3</sup> The Effect of Chemical Amendments Used for Phosphorus Abatement on Greenhouse Gas and Ammonia Emissions from Dairy Cattle Slurry: Synergies and Pollution Swapping, Raymond B. Brennan et al, NUI, PLOS ONE | DOI:10.1371/journal.pone.0111965 June 8, 2015

<sup>4</sup> <https://puro.earth/buy-carbon-credits/>

5. Key Indicator: Local Electricity, Heat and Co-product generation. Local in the bioeconomy means very near to consumers so that grid dependence and losses are minimized.
  - Target: 50% local electricity and heat generation  
This indicator favours photovoltaic on roofs rather than fields. The current size, operational noise and flicker make conventional wind turbines incompatible with settlements in the bioregion (although essential in the current extractive economy). Intermittent nature of non-bio renewable energy requires back up generation or/and electricity storage. Where water bodies and height is available in the bioregion hydro storage is a good solution. Battery storage technology is still problematic in terms of carbon and resource use but evolving rapidly.
  - Target: 20% Agricultural and/or Construction Products  
Anaerobic digestion can produce heat and electricity as well as a useful digestate fertilizer soil conditioner that makes it a good fit in the bioeconomy. Sited near settlements it can co-process human and cattle waste to recover useful nutrients for application in agriculture and where couple with vacuum toilet technology eliminates the need for sewerage treatment plants.  
Biochar production can be scaled up from simple flame kilns to larger pyrolysis reactors to produce heat, bio oils or electricity but it adds very considerably to financial and carbon costs. They are only viable near settlements so that the heat energy can be used locally to offset the higher investment.  
Proximity to settlement also provides access to contaminated carbon rich waste streams where pyrolysis can solve another problem and produce another kind of useful product. Such a waste stream is municipal mixed plastics and paper waste; the product is a charcoal that safely adsorbs contaminants so that it can be used in construction. Construction charcoal materials lock up carbon for the typical 60-year building life – many more years if designed with reuse in mind.  
Pyrolysis reactors can switch from municipal waste to clean biomass within a couple of hours so that it is not dependent on waste streams that will be phased out in a fully functioning bioeconomy. Incineration technology is too specialized to switch feedstock and produces waste fit only for landfill.
6. Key Indicator: Proximity and diversity of building use types  
This is about optimizing settlement pattern to reduce distance and increase innovation in the circular economy. Non-farm related isolated rural houses dependent on individual transport whether ICE or EV care not a good fit in the bioeconomy. The environmental impact of EV manufacture and batteries is such that the vehicle must be shared to maximize return on their embodied carbon, mineral and metal. Luckily their EV batteries can be 95% recycled so their embodied resource capital can be extended. Car sharing requires more compact settlements. Compact settlements in turn foster more use of local shops and services

and with the availability of local reliable energy, opportunities for food processing, manufacturing of items from local resources.<sup>5</sup>

- Target: Reclaim and renovate 100% of vacant buildings in rural villages in towns
- Target : Divert 90% of new house construction from rural sites to existing villages and new rural settlements.

The economic demand for isolated rural houses can be by providing renovated affordable village homes and/or free up front serviced house sites in attractive rural settlements. See Community Land Trusts.

## Research, Development & Innovation Pillar

### Question 4: What key issues should the Research, Development & Innovation Pillar deal with?

How can Agriculture in Ireland be sustainable? In 2021 agriculture represents circa 37.5% of Ireland's circa 61.53 million GHG emissions, 6 mainly from the dairy sector.

A large part of the answer likely includes the production of biochar. Indigenous biochar from agriculture, forestry and other residues e.g. landscaping >1 tonne residues / ha / annum ⇒ >5mt = potentially >1mt of biochar = 3mt of CO<sub>2</sub>e storage potential can store and capture a million tonnes (1,000,000 metric tons) of CO<sub>2</sub>e p.a. in Ireland within 5 years and at the same time reduce a similar amount of GHG emissions from its application.

	Hectares (millions)	
	Ireland	Eu
Agricultural	<a href="#">4.3</a>	<a href="#">157</a>
Forestry	<a href="#">0.77</a>	<a href="#">159</a>

If the rough figures above hold true, biochar could remove 1 million tonnes and reduce another million tonnes of CO<sub>2</sub>e which represents a very significant 10% removal / reduction of GHG from Ireland's agriculture sector.

The question then arises what is the best biochar technology to use? Low-tech, ready-to-scale Kon Tiki kilns<sup>7</sup> have a proven track record, but they don't recycle the heat produced and result in emissions, albeit similar or less than in the baseline or higher tech alternatives, and still lack 'proof of concept' in terms of carbon emission certificates. We suggest that makes sense to start with the imperfect and move to cleaner options rather than delay.

<sup>5</sup> See Enclosure 2 Proximity Principle 2.0 Nov. 2010, page 174, Fleeing Vesuvius, Green Books ISBN 978-0-9540510-1-3

<sup>6</sup> <https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/>

<sup>7</sup> <https://www.ithaka-institut.org/en/kon-tiki>

There are also convincing arguments that to completely eliminate aerosols and particulates from bioenergy may speed up global warming due to their role in reflecting sunlight under certain conditions. Albert Bates made an intriguing response to Hansen et al recent study<sup>8</sup> in this regard. More research is needed in this area.

Research is also needed into the best applications for biochar to maximise its cascading environmental and economic value. It can be usefully added to slurry/ silage/feed/anaerobic digesters/wastewater management. Finely processed feed biochar offers the best financial return but application in high quantities to cattle slurry give the best return in terms of reduction and offsetting of GHG emissions.

Further questions arise into how to best finance biochar projects at each stage and all scales. Local 'Leader' funding is the most promising for early stage project development, if planning and regulatory hurdles can be overcome. Newer forms of funding sources such as 'crowd investing' in anticipation of carbon payments could be explored.

Can fin-tech complement rural livelihoods based on biochar? Decentralised smart phone applications to estimate, geo-reference, and verify biochar production and application can be employed. Blockchain technology can be employed to create a secure, permissioned, database / registry of production and application.

**Question 5: How could the RD&I bioeconomy approach be best structured to support the enhancement, application and scaling-up of biological knowledge and bioeconomy solutions?**

#### Local Innovation Hubs

In an era when shorter supply chains have demonstrated their merit, can facilitate R&D where researchers work with communities and users to meet local needs that are context specific. This again underlines the importance of Bioregional and Community based governance.

#### Local context matters

Researchers need to be 'in the field' to talk to people, to learn and see what is happening in people's lives and in their homes, in their world. Researchers need to see and experience working realities through the eyes of the users of new technologies and methodologies and understand their perspective from real-life connections.

#### Participatory Innovation

The practical user-centred research can generate ideas, techniques and approaches for cleaner bioeconomy initiatives that can be tested and tweaked at

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<sup>8</sup> December 13, 2022, James Hansen and Makiko Sato with 14 co-authors submitted "Global Warming in the Pipeline" to [Oxford Open Climate](#)

## Nature, Climate & Circular Pillar

### Question 6: What key issues should the Nature, Climate & Circular Pillar deal with?

As this pillar describes the three main characteristics of the bioeconomy, it could have responsibility to act as an independent agency measuring and monitoring the indicators and verifying progress to targets set out above. This role requires considerable scientific and technical expertise. The annually collated data should be reported to the Bioregional Governance bodies and grant aid, premia, tax reliefs etc. distributed based on the results.

An outcome-based Inspection and Verification grant support system to replace the current increasingly onerous reporting of inputs and actions by farmers, foresters, fishers etc. Agriculture is governed and incentivized under plethora of schemes with ever changing names and acronyms i.e. SFP, BPS, Disadvantaged Area Aid, GLAS 1/2/3, REPS 1/2/3, BDGP, ICBF, Organic Scheme, ACRES etc.

This kind of system places more of responsibility for compliance with entire community, less on the individual farmer. A large part if not most of the payment should be based the overall health of the relevant ecosystem and the achievements of targets. Peer pressure can be more powerful than penalties.

The Nature, Climate and Circular inspectors must be entirely independent of the Bioregional Governance representatives and staff to obviate conflicts of interests and ensure complete transparency.

Question 7: What key issues concerning consumption patterns need to be examined to close the gap between sustainable supply of biological resources and demand?

The bioregion should aim to supply as much as possible of the biological resources within its borders to feed and support its own local community before trading their surplus to other Irish bioregions and beyond. That requires cascading uses of resources and proximity of different uses to each other. See the Proximity Principle 2.0. Attached.

It also requires more compact settlement patterns than for the fossil energy era. That in turn requires that appropriately sited land is readily available and affordable so that families have more income to chose organic and local products. Absent an effective land value tax covering all land uses, Community Land Trusts can ensure that secure perpetual leases are available to young people for renovated homes and sites on which to build their own homes individually or cooperatively and that new productive, retail and 'waste' processing businesses are affordably and efficiently sited to foster the circular economy.

## Agriculture, Food & the Marine Pillar

Question 8: What key issues should the Agriculture, Food & the Marine Pillar deal with?

This set appears arbitrary except as a Department name. It is better described as the Food Pillar covering in its remit all edible products from the cultivation of farms, forests, and freshwater and saltwater resources. Note, forests cannot be excluded under this pillar because they provide many edible foods; nuts, berries, mushrooms, venison, pork, honey etc.

It should focus on healthfulness and sustainability of these most essential of natural products working with the other Pillars. It should also lead the Marketing for the bioregion as food products have the highest national and international visibility.

### Communities Pillar

Question 9: What key issues should the Communities Pillar deal with?

See answers 1-3 re Bioregional Community Governance.

Question 10: Are local and regional policies ensuring the consideration of bioeconomy opportunities are in scope, and are coordinated approaches on such services in place at regional assembly and local authority level?

They have failed support and enable the local bioeconomy. See extensive treatment of this question under Q 1-3 and Enclosure 1

### Industry & Enterprise Pillar

Question 11: What key issues should the Industry & Enterprise Pillar deal with?  
See below

Question 12: What lead market initiatives could support entrepreneurship, development, innovation and the commercialization of bio-based products, processes, information, and services?

Promotion and support of Platform Cooperatives comprising representatives of 1: (Natural and Money Capital) farmland and forestry owners, ordinary investors, and investor cooperatives 2: (Producers) workers, active farmers, foresters, biochar and biogas producers, specialized contractors, and other producer cooperatives (3 Community) consumers of farm and forestry products including food farm and forestry food, construction timber, wood products, biodiversity and recreational experiences and other consumer cooperatives.



Promotion and support of Community Land Trusts aligned to Platform Cooperatives above and structured similarly to provide affordable sustainable housing and new industrial and retail buildings for the circular economy in the settlements of the bioregions.

These innovative forms of organisations will provide the necessary scale to access ISIF funding, national tax reliefs, cheap EIB loans, EU grants and the voluntary carbon market to compete with extractive economy organisations that benefit exclusively from them at the present time.

**Question 13: Due to the requirement for capital and operational investment what innovations aimed at financing infrastructures and technical and economic evaluation of innovation are necessary to scale up the bioeconomy?**

Access by Bioregional 'Platform Co-operatives' and similarly constituted 'Community Land Trusts' to finance from the Irish Strategic Investment Fund and borrowing at favourable terms from the European Investment Bank, reflecting their superior ESG scores under all criteria, especially those of social governance will be needed

The goal should be to grow the bioeconomy sector to crowd out inferior ESG scored private investment companies, wealth funds and family offices from access to public at risk capital and ultra low interest rates that they have enjoyed to date. That means access to financial and legal expertise that Coillte obviously lacked and which forced it into unfavourable deals with Gresham House and the Nature Trust.

### Knowledge & Skills Pillar

**Question 14: What key issues should the Knowledge & Skills Pillar deal with?**

We assume the original definition 'economy' from the Greek root 'oikonomia' referred to "household or state management or budgetting " that doesn't require outside money aka 'chrema' in Greek<sup>10</sup> for the bioeconomy. But in the current world, outside money will be needed. It is now painfully apparent as evidenced by the continuing housing crisis that relied on outside money and the recent events concerning Coillte, that knowledge and skill in 'chrema' in completely lacking in the public sector, semi state sector and regional agencies. This lack must be addressed immediately.

Fund ICOS to host a 'Bioeconomy Fund Management Team' with professionally qualified and certified staff with skills and experience equivalent to a

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<sup>10</sup> "The Future of Money: Trend-Alternatives-Potentials", Athens, 24 May 2018. The American School of Classical Studies (Gennadius Library),

Fund/Administrator as defined and regulated by the Irish Central Bank. The Team will provide expertise to access the global market in international market carbon credits, the ISIF and EIB and ESG investment sector generally.

**Question 15: Can the regional skills and regional enterprise approaches better support bioeconomy development?**

If governance of the bioeconomy is based on natural Bioregions led by the local community, local actors will then be in a stronger position to benefit from the skills and enterprise supports that regional agencies offer because they will have identified their needs through local research and development. See also answers re Research and Development Pillar.

**Question 16: An important part of developing the bioeconomy is to determine the most appropriate practices, treatments, technologies, logistics and business models to valorise ecosystem services, primary and secondary biomass resources. What role do advisory systems play in addressing this challenge?**

The business model most appropriate to the ethos and logic of the bioeconomy is that of **'Platform Cooperatives'** and **'Community Land Trusts'**, land in this case covers all natural resources i.e. water, minerals, fisheries, biodiversity. Valorisation is available for selected bioeconomy products and services (such as biochar) in the international Carbon certificate market. In addition, funding for high ESG scoring bioeconomy businesses is available from the EU, the EIB, Irish Pension Funds and other ethos sharing investment funds and trust.

### Other Questions

**Question 17: Are there any further Pillars/Issues that this Action Plan should address?**

No

**Question 18: Indicate what the top five priorities for action in the bioeconomy over the next three years should be?**

1. Establish 'Bioeconomy Governance' Agencies based on the natural Bioregions with tripartite representative structure of
  - 'Consumers': resident communities, visitors to the area
  - 'Producers': farmers, foresters, fishers, processors, manufacturers, bioenergy producers working in the area,
  - 'Service Providers': professional, technical, educational providers, retailers, hospitality and personal services, cooperatives and trusts, social and environmental NGOs serving the the area.

2. Pass the 'Co-operative Societies Bill 2022', long overdue, to foster Platform Cooperatives and Community Land Trusts (that share the same ethos). At present, cooperatives have to make do by registering under the Industrial and Provident Societies (IPS) Acts 1893, which severely restricts their access to capital and borrowing, or as companies under the Companies Act 2014 and use their articles or/and constitution to reflect their co-operative ethos.
3. Fund ICOS to host a 'Fund Management Team' with professionally qualified and certified staff with skills and experience equivalent to a Fund /Administrator as defined and regulated by the Irish Central Bank. The Team will provide expertise to access the global market in voluntary carbon credits, the ISIF and EIB and ESG investment sector generally. This is urgently needed to obviate the need for the Public owned organisations such as Coillte forming 'constructs' 'with a private Fund Manager 'Gresham House' and a private Insurance Company '

[REDACTED]

**Chair Irish Biochar Cooperative**

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