B4SS Project Recommendations

How to enhance the effectiveness of biochar

Audience/ Focus	Scientists, students/ bio-physical and technical aspects	Farmers, landholders/ socio-economic aspects	Policy makers/ policy and implementation
Biomass source	Biomass must be sustainably- and locally-sourced without causing environmental degradation and preferably using a biomass source that would otherwise cause environmental harm (e.g. eutrophication, GHG emissions) such as crop and forestry residues.	A biochar system is likely to be adopted when it replaces other costly (financial, time, environmental) inputs (e.g. nutrients, fuel, lime). A participatory approach with farmers is encouraged for promoting the use of biochar in sustainable land management.	Focus on biomass that leads to avoided environmental costs, such as human health (e.g. burning of crop residues), biosecurity concerns (e.g. weeds, animal disease), and water pollution (e.g. manures). Apply suitable regulation to manage potential biosecurity and contamination concerns (e.g. heavy metals).
Biochar production	Low emissions: GHGs, particulates, carbon monoxide, nitrogen oxides, sulphur dioxides (e.g. use engineered kilns that have been thoroughly tested, or Kon Tiki kilns operated according to guidelines*). Must use dry biomass (<20% moisture content) of appropriate size. Quench biochar with nitrogen sources, manures, minerals, compost. Ideally, use the energy co-generated during biochar production (e.g. for heat or electricity).	Biochar or biochar mineral mixes must be cost-effective, easy and safe to produce; and biochar products must be safe and easy to handle. Produce and/or use a biochar with properties that can address the soil constraint identified.	Focus on technology development, training, distribution and commercialisation.
Biochar application to soil	Formulation: co-composting or combining with nutrients can enhance agronomic benefits and/or reduce fertiliser requirements. Biochar should be most effective when: 1. applied to soil with low pH, low CEC and coarse texture, 2. nutrient use efficiency is low (e.g. due to N leaching, P fixation), 3. acidified biochars are applied to high pH soils that have been degraded; and/or 4. restoring soil health (contamination from heavy metals, PAHs, organic pollutants; mine site rehabilitation).	Identify a soil constraint (e.g. low soil pH, low water holding capacity) that biochar could address. More readily adopted where biochar integrates with existing practices. Identify options where biochar replaces/enhances/ complements what farmer is already doing. Apply biochar to high-value crops. Use biochar to reduce noxious emissions and odour from manures. Up-scaling: work with landholders, champion farmers, extension agents, involve broad stakeholder groups and policy makers.	Focus on addressing a production constraint where no or few other options exist locally, that are affordable and accessible. Include biochar in resilience and sustainable development programmes. Biochar can be used to meet land degradation neutrality targets.

* See https://biochar.international/guides/biochar-reactor-to-meet-needs/

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www.biochar.international

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